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Original Communications.

PROPHYLACTIC HYGIENE.

LECTURE III.—ON PTOMAÏNES AND LEUCOMAÏNES.*

BY PROFESSOR DUJARDIN-BEAUMETZ, PARIS, FRANCE.

GENTLEMEN:—In my first lecture I told you that the new data of prophylactic hygiene are derived from the knowledge of the pathogenic microbes on the one hand, and, on the other, from the discovery of poisons which the economy elaborates at each instant,—the ptomaïnes and leucomaïnes. A sound prophylaxis, in fact, ought not only to protect us from diseases which come from without, and of which the pathogenic microbes are the factors, but also furnish us the means to expel from the economy the toxic matters which tend to accumulate there; for, as Bouchard has well said, "the organism is in the normal state, as in the pathological state, a receptacle and a laboratory of poisons."

In the foregoing lecture I made known to you as briefly as possible the principal pathogenic microbes. It remains for me now to take up this great and important question of organic alkaloids. Then, when we shall have gained a tolerably exact knowledge of the two enemies that prophylactic hygiene has to

* Advance sheets of a lecture delivered in Cochin Hospital, and prepared for this journal by E. P. Hurd, M.D.

combat, we shall be able to enter into the very core of our subject, by giving our attention to infections and to toxæmias, and the means of combating them.

You have seen the important and capital part which our country has had in the discovery of the micro-organisms, and I have shown you that it is to Pasteur that the honor belongs of having opened to medicine and to hygiene the new paths into which both are pressing to-day. It is also France that claims the priority in this question of the toxic alkaloids furnished by the economy, and there are two names which will frequently come up in the course of these lectures, those of my two eminent colleagues and friends, Armand Gautier and Bouchard.

The subject which I am to undertake is one of great complexity. I ask, then, your kind attention to the details into which I am about to enter, and, for the sake of order, I shall divide my lecture into two parts. In the first I shall study the ptomaïnes; in the second, the leucomaïnes.

The name *ptomaïnes* (πτωμα, cadaver) has been given to the alkaloids furnished by putrefaction; the discovery of these alkaloids goes back to the year 1872. Physiologists had previously called attention to the virulence of certain cadaveric extracts; thus it was that Gaspard and Stich had shown the great noxiousness of these extracts, while Panum, in 1856, obtained from putrefaction a poison which he compared to the venom of a serpent. Dupré and John Bens, moreover, in 1856, extracted from a cadaver an alkaloidal substance which they compared to quinoidine, and to which they gave the name of *animal quinoidine.* It is a matter of medical history, also, that in 1868 Bergmann and Schmiedeberg discovered in putrefied yeast, then in the blood, a poison to which formerly a considerable rôle was assigned in the origin of septicæmia, and which they called *sepsine.* Lastly, in 1869, Sonnenschein and Sulzer, in studying from a chemical point of view some anatomical macerations, found there an alkaloid having an action similar to atropine and hyoscyamine; then we come to the discoveries of Gautier and of Selmi, which were made almost simultaneously between the years 1870 and 1877.

Gautier first noticed that blood fibrine, left during the summer under a stratum of water, produced certain complex alkaloids, fixed or volatile. About the same time, Selmi, Professor of Legal Medicine at the University of Bologne, while making some medico-legal analyses, noted the presence of alkaloids different from any heretofore known.

In 1872, Selmi communicated the result of his first researches by the announcement that he had found in the stomachs of persons that had died a natural death, certain substances similar to the vegetable alkaloids, and which were neither creatine nor creatinine. In reply to numerous objections which were made, and which pertained chiefly to the introduction of these alkaloids by the food, Selmi, in 1877, reproduced the experiment of Gautier, and announced to the Academy of Bologne (session of December 6), that in subjecting to putrefaction pure albumen kept away from the air he had obtained two alkaloids. From this time onward researches multiplied with extreme rapidity.

Nencki, in a work published in Berne in 1876, announced that the digestive action of the pancreatic juice on gelatin produces a special alkaloid, to which he gave the name of collidine ($C_8H_{11}N$), and he isolated this alkaloid in a state of purity. Then Gautier and Etard* found in the putrefied flesh of the mackerel and in the flesh of a horse several other bases, and in particular hydrocollidine ($C_8H_{13}N$). In 1883, Guareschi and Mosso† detected the presence of a pyridic base ($C_{18}H_{15}N$) in the fibrine of putrefied beef. Gabriel Pouchet, in his turn, found two bases having for formulæ $C_7H_{18}N_2O_8$ and $C_5H_{12}N_2O_4$. Bocklisch, resuming the researches of Gautier and Etard on putrefied fish, detected in the flesh of the perch certain alkaloids, to which he gave the name of *putrescine* and of *ganidine.*‡ But we have to come down to the time of the publication of Brieger's work to obtain precise data respecting the sum total of these ptomaïnes.

Brieger has studied successively the ptomaïnes of peptones, then those of flesh and of putrefied fish, and lastly cheese ptomaïnes.§ It is from an attentive study of all the works that I have mentioned, and with the work of Brieger before me as my basis, as well as the important memoir that Professor Debierre,‖ of Lille, has published on Infectious Diseases,

* Gautier and Etard, *Compt.-Rend. de l'Acad. des Sciences*, t. lxxxiv. p. 1601.

† Guareschi and Mosso, *Arch. Ital. de Biol.*, t. ii. p. 369.

‡ Bocklisch, *Berichte der Deutschen Chemischen Gesselschaft*, Bd. xviii. p. 86, etc., 1885.

§ Brieger, "Microbes, Ptomaïnes, et Maladies." Paris, 1887.

‖ Debierre, "Les Maladies Infectieuses, Microbes, Ptomaïnes, et Leucomaïnes." Paris, 1888.

that I shall now enter on the description of the principal of these ptomaïnes.

Tanret, in 1882, had noticed this fact that the peptones present most of the reactions of alkaloids. Brieger added another fact to this item of knowledge, by showing that if you make pepsin act directly on moist fibrine, you obtain a toxic alkaloid, to which he has given the name of *peptotoxine*. This peptotoxine, in the dose of a few drops, causes the death of frogs in sixteen minutes.

From putrefied meat, and, in particular, from that of the horse, Brieger has obtained the following alkaloids: first, neuridine, $C_5H_{14}N_2$, which does not appear to be toxic; then putrefactive neurine, which has physical, chemical, and physiological properties identical with neurine, and crystallizes in needles. This putrefactive neurine is excessively toxic, and in the dose of 2 to 5 milligrammes determines in the frog paralytic phenomena in a few minutes; in mammals it produces symptoms of poisoning, characterized by salivation, disturbances of respiration, and very intense disorders of the digestive tube, consisting in excessive peristalsis and copious diarrhœic discharges, first of some consistence, then liquid. This putrefactive neurine produces in animals contraction of the pupils; its action varies according to the animals under experimentation, the cat being more sensitive than the hare. To kill the latter animal four centigrammes of putrefactive neurine for each kilogramme of the hare's weight are required.

When you compare the action of this alkaloid with that of other known alkaloids you see that it much resembles muscarine, and that it is identical with that of the neurine which is found normally in the brain; it resembles also the action of choline, but this latter is much less toxic, since it takes fifty centigrammes of chlorhydrate of choline for each kilogramme of weight to kill the animal. Lastly, there exists a very marked antagonism between this putrefactive neurine and atropine.

Putrefied fish, as we have just seen, are an important source of ptomaïnes. Thus, there have been found therein neuridine, hydrocollidine, ganidine, parvaline, and, lastly, ethylene-diamine, discovered by Brieger. This ethylene-diamine is excessively toxic, like neurine; it produces salivation, cardiac troubles, and paralytic phenomena. Lastly, we find also an *animal muscarine*, similar to *vegetable muscarine*, and having the same toxic properties. Cheese also contains toxic alkaloids; instance the tyrotoxin discovered in 1885 in putrid cheese by Dr. Vaughan.

All these discoveries present a great interest, and I shall have more to say about them when I come to speak of prophylaxis by alimentation. I shall then show you that the gastric embarrassment, the indigestion, the numerous intestinal troubles, and even fatal symptoms which often result from the ingestion of putrefied food, have for their sole cause the presence in the digestive tube, in greater or less quantity, of the alkaloids which I have before mentioned. But all these studies have a greater interest, importance, and definiteness when it is a question of examining the divers alkaloids which may be produced by the putrefaction of the human body.

You are not ignorant of the importance which legal medicine attaches in cadaveric examinations to the presence of alkaloids found in the viscera of bodies under inspection. It was formerly believed that such alkaloids must have been criminally introduced into the digestive tube to cause the death of the person, and the diagnosis of homicidal poisoning was often rendered in consequence of such findings.

To-day the question seems to be decided. The processes of putrefaction which the cadaver undergoes cause the production of alkaloids, some toxic and some not toxic, and pathologists are now acquainted with a great number of these alkaloids,—cholidine, $C_5H_{15}N_2$; neuridine, $C_5H_{14}N_2$; cadaverine, $C_5H_{16}N_2$; putrescine, $C_4H_{12}N_2$; saprine, $C_5H_{16}N_2$; trimethylamine, $(CH_3)_3N$; midaléine,—and the list is still far from being complete.

I cannot here enter into all the details pertaining to this question of legal medicine, but what I can affirm is that Brieger has shown us that each stage of putrefaction is accompanied by the formation of new alkaloids, some toxic, some innocuous. When once life has ceased, choline first appears, then neuridine, cadaverine, putrescine; none of these alkaloids are toxic. But from the seventh day after death the toxic alkaloids show themselves, and, in particular, midaléine, which is highly poisonous, provokes profuse diarrhœas, vomitings, then intestinal inflammation, and causes the death of guinea-pigs in the dose of 5 milligrammes.

Moreover, this catalogue of ptomaïnes tends to increase every day, and this, according to Guareschi,* is the list of ptomaïnes which were known at the end of last year:

* "Annali di Chemica e di Farmacologia," 1887, p. 237.

Formula.	Name.	Discoverer.	Origin.	Physiological action.
$H_{11}N$	Tetanotoxine.	Brieger.	In cases of tetanus.	?
$C_5H_{14}N_2$	Neuridine.	Brieger.	Human cadavers.	Non-toxic.
$C_5H_{16}N_2$	Cadaverine.	Brieger.	Human cadavers.	Non-toxic.
$C_4H_{12}N_2$	Saprine.	Brieger.	Putrid meat.	Non-toxic.
	Putrescine.	Brieger.	Putrid meat.	?
	Midaléine.	Brieger.	Putrid meat.	?
$C_8H_{11}N$	Collidine.	Nencki.	Putrefied gelatin.	?
$C_8H_{17}N$	Hydrocollidine.	Gautier and Etard.	Spoilt meat.	Convulsivant.
C_5H_7N	Parvoline.	Gautier and Etard.	Spoilt fish.	?
$C_9H_{13}N$	Unnamed.	Guareschi and Mosso.	Decomposed fibrine.	Action of curare.
$C_{10}H_{13}N$	Unnamed.	Gautier.	Putrid meat.	?
$C_{17}H_{33}NO_4$	Choline.	Brieger.	Putrid meat.	Action of curare in a mild degree.
$C_5H_{13}NO_2$	Neurine.	Brieger.	Putrid meat.	Action of curare in a mild degree.
$C_5H_{15}NO_3$	Muscarine.	Brieger.	Putrid fish.	Moderate toxicity.
$C_3H_9NO_2$	Gadinine.	Brieger.	Putrid fish.	Not toxic.
$C_5H_{11}NO_2$	Unnamed.	Salkowski.	Putrid meat.	Not toxic.
$C_5H_{11}NO_2$	Unnamed.	Salkowski.	Putrid meat.	?
$C_6H_{15}N_2O_6$	Unnamed.	Pouchet.	Putrid meat.	Toxic.
$C_7H_{19}N_2O_4$	Unnamed.	Pouchet.	Putrid meat.	Toxic.
$C_5H_{13}NO_2$	Mytilotoxine.	Brieger.	Mytilus edulis (mussel).	Toxic.
$C_6H_{13}NO_2$	Midatoxine.	Brieger.	Decomposed cadavers.	Action of curare.
$C_6H_{11}NO_2$	Midine.	Brieger.	Decomposed cadavers.	?
$C_5H_{11}NO_2$	Betaine.	Brieger.	Spoilt fish.	?
$C_5H_{11}NO_2$	Typhotoxine.	Brieger.	In cases of typhus.	Toxic.
$C_7H_{17}N_3O_4$	Tetanine.	Brieger.	In tetanus.	Medium toxicity.
$C_{13}H_{30}N_2O_4$	Unnamed.	Guareschi.	Decomposed fibrine.	?
$C_{14}H_{20}N_2O_4$	Spasmotoxine.	Brieger.	In tetanus.	Medium toxicity.
Not determined	Tyrotoxine.	Vaughan.	Cheese.	Toxic.

You know that experts in legal medicine have endeavored to find chemical characters which differentiate these cadaveric alkaloids from the vegetable alkaloids. Brouardel and Boutmy thought that only the former have the property of reducing ferric chloride in presence of ferrocyanide of potassium, and thus to give a characteristic blue color. Unfortunately, this sign has not the value which these experts had attributed to it, and Gautier has, in fact, shown that apomorphine, morphine, muscarine, and eserine have this property.

We must, then, recognize the fact that these ptomaïnes do not present any characteristic reactions, unless it be those which are produced by all the alkaloids, whether they be animal or vegetable. Thus it is that Meyer's and Nessler's tests, ioduretted potassium iodide, iodide of bismuth and potassium phosphomolybdate of sodium, which precipitate the vegetable alkaloids, also precipitate the ptomaïnes. This question has, moreover, been much studied by an Italian commission charged with the investigation of this subject from a medico-legal point of view.*

These ptomaïnes are, then, in brief, diamines belonging to the fatty series; they are oily, alkaline liquids, which exactly saturate strong acids, thus constituting crystallized salts. These salts are very oxidable, and endowed with a great reducing power; they are all soluble in alcoholic ether, and many of them dissolve in chloroform and amylic ether.

The ptomaïnes have certain color reactions, which Selmi and Gautier have made known to us. Thus, dilute sulphuric acid colors them violet-red; hydrochloric acid produces the same coloration, which grows deeper if heated; lastly, nitric acid, when heated with these ptomaïnes and saturated with potassa, gives a beautiful golden-yellow color.

Such, gentlemen, are the principal data which I desired to bring before you relative to ptomaïnes. You will not fail, if duly impressed by these facts, to keep in mind the importance which these ptomaïnes may have from the point of view of poisoning by articles of food. It seems to-day demonstrated that gastric embarrassment (*embarras gastrique*), whether acute or chronic, is, oftener than otherwise, the result of absorption of these ptomaïnes, whether introduced with the food or whether due to putrid fermentation (which the stomach is unable to prevent) of organic substances ingested with food. Recall to your minds the symptoms determined by these ptomaïnes, and you will have an exact reproduction of the colics, the diarrhœa, the intestinal hypersecretion, and

* This commission was appointed by the University of Rome in 1885, vide *Gazetta Chemica*, t. xiii., 1885.

all the more or less grave general troubles which characterize gastro-enteritis at all its periods.

It remains for me now to speak to you of a subject still more interesting,—namely, of leucomaïnes.

It was Armand Gautier who gave this name of *leucomaïnes* (λευκωμα, white of egg) to the alkaloids which the living animal cell secretes in the normal as in the abnormal state, and we shall have, then, to study here these physiological and pathological leucomaïnes under two distinct heads.

As for the leucomaïnes occurring in the physiological state, before taking up the researches of Gautier, and the important conclusions flowing therefrom,—important both in their bearing on pathology and prophylactic hygiene,—I must give a short *résumé* of the history of these alkaloids.

When, in 1849, Liebig discovered in the urine the presence of creatine, an organic alkaloid, physiological chemists thought that this discovery was destined to bring to light the presence of other alkaloids secreted by the organism in the normal condition; this did not at that time hold true, and even Liebig rejected the hypothesis that creatine, which had a formula like that of the alkaloids, $C_4H_9NO_2$, could constitute an organic base. Twenty years after, Liebrich found in normal urine an alkaloid betaïne, with the formula $C_5H_{11}NO_2$.

In 1880, Gabriel Pouchet* detected in the urine, besides the presence of creatine and of betaïne, that of allantoine, of carmine, and, lastly, an undetermined alkaloid. Then, in 1881 and 1882, began to appear the communications of Gautier and of Bouchard, to which I shall return presently when we have studied the mechanism of the production of these leucomaïnes.

In 1883, Mourson and Schlagdenhaufen† detected in the amniotic liquid of an infant at the moment of birth a substance having the character of alkaloids. The same year Bocci‡ showed that urine possesses toxic properties, and acts like curare on frogs and mammals. Lépine§ and Guerin, in 1884, extracted from urine by means of ether the same toxic alkaloids; then we come down to the work of Foa and Pellacani.‖ These Italian experimenters took fresh viscera, macerated them in water, and injected these macerations in given quantity in the jugular vein of hares, and showed that these macerations produce more or less rapidly fatal toxic symptoms, which enabled them to classify the different viscera in the order of their toxicity; the cerebrum has the highest place, then the suprarenal capsules, the testicles, the kidneys, and the lymphatic glands. The spleen was found to be devoid of all toxic action.

After this preliminary historical statement, I come now to the labors of Bouchard and Gautier, which complete these data.

As we have already seen in the first part of this lecture, in the year 1872 Gautier discovered that the fibrine of the blood, left to itself under water during the summer months, gives rise to certain fixed and volatile alkaloids. Gautier, continuing his researches, then showed that fresh meat may contain these same alkaloids, and in a series of memoirs he describes the muscle-leucomaïnes, such as xanthocreatinine ($C_5H_{10}N_4O$), crusocreatinine ($C_5H_8N_4O$), amphicreatinine ($C_9H_{19}N_7O_4$), pseudoxanthine ($C_4H_5N_5O$), and certain bases having for formula $C_{11}H_{24}N_{10}O$ and $C_{12}H_{25}N_{11}O_5$.

Gautier operated with fresh beef-muscle and with Liebig's extract of beef. All those bases which I have just mentioned are crystallized, and form with acids salts more or less stable. To these alkaloids we must add adenine, which Cassel discovered in 1886. This base has this point of interest, that its formula is exactly the quintuple of that of hydrocyanic acid, and that treated by potassa adenine gives rise to cyanide of potassium.

If you will recall to mind that xanthine may be formed by synthesis, by acting on hydrocyanic acid, and that, moreover, adenine is itself transformed into hypoxanthine, you will readily understand why it is that physiologists have compared the action of these toxic alkaloids to that of the cyanides, and that Gautier, working from this hypothesis, has endeavored to show that the framework of cellular protoplasm has these hydrocyanic compounds for its basis.

Hence, then, thanks to these brilliant re-

* Gabriel Pouchet, *Thèse de Paris*, 1881, p. 21.

† "New Chemical and Physiological Researches in Certain Organic Liquids" (*Compt.-Rend. de l'Acad. des Sci.*, October 30, 1882).

‡ Bocci, *Centralbl. für die Med. Wiss.*, No. 51, 1882.

§ Lépine et Guerin, "Sur la presence d'alcaloides toxiques dans l'urine et dans certains liquides pathologiques" (*Revue de Médecine*, t. lvi. p. 767, 1884).

‖ Foa and Pellacani, "On the Fibrogenous Ferment, and on the Toxic Actions exercised by Certain Fresh Tissues" (*Arch. Ital. de Biologie*, t. iv. p. 56).

searches, it is now an established fact that it is quite easy to find in flesh, and even in certain viscera, like the spleen, from which Morelle, one of Gautier's pupils, has extracted a very toxic alkaloid,—it is quite easy, I say, to obtain from these organs and tissues when in the fresh state certain organic alkaloids, the leucomaïnes, which are similar in their action to the alkaloids of putrefaction, the ptomaïnes.

But Gautier did not stop here; his generalizing spirit led him farther. Comparing the animal cell to the vegetable cell, he showed that both may produce alkaloids, and just as the vegetable cell of the cinchonas produces quinine and a series of other alkaloids, so our cells fabricate alkaloids, some toxic, others innocuous.

But these alkaloids cannot accumulate in our economy without danger, and it is necessary that they shall be constantly eliminated by the different emunctories. This it is that led Gautier to examine the saliva and the venom of serpents. Already many years before, in 1852, Cloès* had indicated the presence of alkaloids in the venom of the toad and the salamander.

In 1866, Zaleski isolated one of these alkaloids in the state of purity, and gave it the name of salamandrine ($C_{34}H_{60}N_2O_5$). In 1872, Corre, comparing the poison of the venomous fishes of the Chinese and Australian seas to the venom of serpents, showed their great similarity, and pointed out the presence of alkaloids in the toxic humor secreted by the fishes.†

Gautier then analyzed the venom of the cobra-de-capello, and found there two new alkaloids, the one of which produces somnolence and torpor, the other, intestinal troubles without causing death. These alkaloids are not, then, the most active constituents of this venom.

Then Gautier examined the saliva of man, and extracted therefrom certain alkaloids which are toxic to small animals like the sparrow. In short, the saliva is one of the channels of excretion of the alkaloids produced by the living cells of the organism. But it is chiefly by the urine that these alkaloids pass out of the economy; and this brings us to a new order of researches, for the most of which we are indebted to Professor Bouchard and his pupils.

In 1881, Felz and Ritter showed that the injection of urine, just as it is voided, into the veins of animals causes their death. Bocci, about the end of 1882, repeated the experiments of Felz and Ritter, and showed that urine is a poison. In 1883, Schiffer made extracts of urine by ether, and showed that these extracts injected under the skin of frogs produce the death of these animals.

Gabriel Pouchet, in his turn, had noticed in urine the presence of toxic alkaloids, and Bouchard in 1882 found these toxic alkaloids, but only in pathological urine. Dupard and Lépine repeated these discoveries in 1883 and 1884, then Lépine and Guérin, detecting in pathological urine the presence of alkaloids. In 1884, Bouchard began his researches on normal urine, the results of which he made known in various communications in 1886.

He made use of the hare as the subject of his experimentation, and he injected into the veins of the ear of this animal variable quantities of urine. He first examined the toxic symptoms produced by the introduction of urine into the circulation of the hare. These phenomena are essentially characterized by contraction of the pupils, acceleration of the respiratory movements, incoördination of the movements, somnolence, hypothermia, diminution of the palpebral and corneal reflexes, and death supervenes in coma without convulsions, or with moderate spasms. During all this pathological scene the animal frequently voids urine.

Then Bouchard established his system of urotoxy,—that is to say, the determination of the quantity of urine necessary to kill each kilogramme of the animal. This quantity is represented by forty-five cubic centimetres of normal urine.

The adult and healthy man eliminates in the twenty-four hours for each kilogramme of his weight a quantity of urinary poison capable of killing 464.5 grammes of living matter; its urotoxic coefficient is then .4645 kilogramme, and it takes two days and four hours on an average for a man to fabricate a mass of urinary poison sufficient to kill him. Then Bouchard examined the modifications which are effected in these urinary poisons by the ordinary physiological phenomena. He showed that the toxicity of the urine varies during waking and during sleep. It is at its minimum when the man is sleeping, and augments during sleep. Muscular labor has also a great influence on this toxicity, and suppresses thirty per cent. of the total tox-

* Cloès, *Compt.-Rend. de l'Acad. des Sciences*, 1852, t. xxxiv. p. 729.

† Corre, *Archives de Physiologie*, t. iv. p. 405.

icity of the urine voided in twenty-four hours, twenty-seven per cent. of the toxicity of the urine of the waking hours, and forty per cent. of the toxicity of the urine of the sleep which follows. Moreover, the urine of waking and that of sleep have not the same toxic action; that of the waking hours is narcotic, that of sleep convulsivant.

Ever pushing his investigations farther, Bouchard shows that there is not merely one urinary poison, but a series of poisons, and he has obtained seven distinct toxic substances: a diuretic substance, which is urea, —urea, by the way, is but little noxious of itself, since it takes six grammes for each kilogramme of the animal's weight to cause death; a narcotic substance; a sialagogue substance; a substance which contracts the pupil; another which produces a fall in the temperature; lastly, two convulsivant substances, the one of organic nature, the other mineral,—namely, potassium.

So much for this brief statement of these important researches. If you would study this subject in all its details, you will have to consult the admirable lectures of Professor Bouchard,* where everything that pertains to the toxicity of urine is set forth by the hand of a master.

So, then, it is well established that the economy furnishes incessantly toxic substances which are eliminated by the different emunctories, and particularly by the urine.

As for the toxic substances, leucomaïnes or ptomaïnes which are introduced by the food, they are either eliminated by the urine or fæcal matters or destroyed by the liver.

In the pathological state we also find leucomaïnes which are fabricated by the economy. Bouchard† in 1882 showed that in the urine of infectious diseases we may find alkaloidal substances. Felz,‡ in his turn, has shown the special toxicity of pathological urine. Villiers,§ in analyzing the bodies of some individuals that had died of cholera in the service of Professor Hayem, found some alkaloidal bases having an odor of aubepine (white hawthorn), and possessing a great toxicity. Pouchet has extracted from the dejections of cholera patients an alkaloid substance.‖ This discovery was attended with this curious fact, that while Pouchet was endeavoring to crystallize this chlorhydrate base by evaporation over a sea-bath, he was taken with toxic symptoms very similar to cholera, such as chills, cramps, nausea, and suppression of urine, the latter lasting more than thirty hours.

There remains the grave question of the production of leucomaïnes by the pathogenic micro-organisms. It is certain that we find in the culture-broth of many micro-organisms leucomaïnes more or less toxic. Brieger has succeeded in extracting from the culture-broth of *bacillus typhosus* an alkaloidal substance having all the reactions of alkaloids, moreover, very toxic, which he considers as a triamine. Likewise, in cultivating *staphylococcus pyogenes aureus*, he also succeeded in obtaining by his process of extraction a special alkaloid. These facts, moreover, have been repeated with other bacilli, and it is no longer doubtful that many pathogenic bacilli furnish toxic alkaloids in the same manner as every living cell. When I shall speak of attenuated virus and of vaccines, I shall show you that it is on the presence of these ptomaïnes secreted by certain microbes that chemical vaccine is based; in particular, that of cholera, in accordance with the brilliant researches of Gamaleia, of Odessa, that of septicæmia, in accordance with the experiments of Roux, and probably that of rabies, if we may trust the investigations of Peyraud, of Libourne, and especially the recent communication of Pasteur.¶

What rôle do these toxic alkaloids play in the pathologic scene determined by these pathogenic microbes? This is what remains for us to examine, and this shall be the subject of my next lecture, in which I shall take up the study of infection and of toxæmia.

These brief data which I have furnished you respecting the pathogenic microbes and the organic alkaloids will enable you better to understand the developments into which I am now to enter. Hence you will pardon me for having given a certain importance to the study of these micro-organisms and these alkaloids.

* Bouchard, "Les Auto Intoxications dans les Maladies." Paris, 1887.

† Bouchard, "On the Presence of Alkaloids in the Urine in the Course of Certain Infectious Diseases" (*Comptes-Rendus de la Société de Biologie*, August 5, 1882).

‡ Felz, *Acaëmie des Sciences*, April 1, 1886.

§ Villiers, "On the Formation of Ptomaïnes in Cholera" (*Compt.-Rend. de l'Acad. des Sciences*, January 12, 1885, p. 91), and "On the Formation of Alkaloids in Diseases" (ibid., April 20 and May 11, 1885, p. 1073).

‖ Pouchet, "On the Modifications which are produced in the Chemical Composition of Certain Humors under the Influence of Epidemic Cholera" (*Acad. des Sciences*, January 26, 1885).

¶ Pasteur, "On the Preventive Vaccination of Cholera" (*Acad. des Sciences*, session August 20, 1888).

*CAUSAL THERAPEUTICS IN THE INFECTIOUS DISEASES.**

A CLINICAL EXPERIMENT

(ENTERIC FEVER—PHTHISIS).

BY J. C. WILSON, M.D.,† PHILADELPHIA, PA.

THE discoveries of Hoffa, Brieger, Vaughan, Bourget, and others within the last few years have done much to clear up the relation between the special pathogenic germs of the infectious diseases and their symptomatology. They have also rendered necessary a new definition of the infectious diseases. In the words of Vaughan and Hovy,‡ "An infectious disease arises when a specific, pathogenic micro-organism, having gained admittance to the body, and having found the conditions favorable, grows and multiplies, and in so doing elaborates a chemical poison which induces its characteristic effects."

The germ theory as a working hypothesis has revolutionized surgery and robbed midwifery of the chief of its terrors. It has given us an antiseptic procedure which reaches the perfection of simplicity in ideal cleanliness and recently-boiled water. It has made quarantine reasonable, preventive medicine a power, and prophylactic measures intelligible to the people. Isolation and disinfection have now an obvious and definite purpose. But until it came to be known that pathogenic micro-organisms produced the definite chemical poisons called ptomaïnes the demonstrated facts of bacteriology shed but little light upon the clinical phenomena of the infectious diseases; still less did they directly influence treatment except locally. For countless investigations have shown that antiseptic medication by way of the mouth has little effect upon the specific bacteria of a developed disease. Nevertheless, despite innumerable failures, something has already been accomplished, and, to quote Welch,§ "One need not be of a very sanguine temperament to hope that our steadily-increasing knowledge will bear fruit, not only, as in the past, in the prevention of these diseases, but also in a rational system of causal therapeutics."

The production of special ptomaïnes by specific bacteria is probably a necessity of the growth and multiplication of these bacteria, and that which interferes with the splitting up of the complex chemical compounds of the body proportionately interferes with that growth and multiplication. It is in this way, doubtless, that antiseptics render organic substances insusceptible to the action of putrefactive germs rather than by direct action upon the germs themselves.

What may be the mode of action of vaccination or of the inoculation of attenuated virus is at present past finding out, but the effects are manifested upon the tissues and the fluids of the body. It is by acting upon the substances that constitute the culture media of the bacteria that their growth and multiplication are to be interfered with by therapeutic means, rather than by directly acting upon the bacteria themselves when they have already invaded the organism and caused disease.

The cases which form the basis of this communication are submitted to your consideration as illustrations of a mode of treatment not hitherto employed in enteric fever and pulmonary tuberculosis. I have no theory to offer to the Association as to whether or not the salts of mercury undergo possible modifications when taken by the mouth, which they escape when administered hypodermically, nor as to possible differences in their effects when undergoing slow absorption and acting continuously, as compared with their action when given in separate doses in a form permitting rapid absorption and elimination.

The cases are submitted as a contribution to the subject of causal or etiological therapeutics in contradistinction to all forms of symptomatic and expectant treatment.

Rendot,‖ in 1887, treated with satisfactory results a series of cases of enteric fever by the administration of mercuric chloride in daily doses of from 2 to 5 milligrammes ($\frac{1}{33}$ to $\frac{1}{12}$ grain). This quantity was given in divided doses at intervals of two hours. To the objection that in these minute doses the drug is inadequate to produce physiological effects, Dr. Rendot replies that the doses are scientifically rational, and that they fulfil a positive indication of the typhoid infection. They are insufficient to destroy the vitality of the bacteria of typhoid fever, but possess, he believes, the power of neutralizing the toxic principles produced by their functional activity. Is it not possible that the action of

* Read before the Association of American Physicians at its third annual meeting, held at Washington, D.C., September 18 to 20, 1888.

† Attending Physician to the Philadelphia Hospital and to the Jefferson Hospital.

‡ "Ptomaïnes and Leucomaïnes," 1888.

§ "Modes of Infection." Annual Address, 1887.

‖ *Gaz. Hebdom. Sciences Méd.*, Bordeaux, December 11, 1887.

the mercuric chloride tends rather to restrain the formation of these toxic principles?

Some months ago while investigating the method of treating syphilis by the intramuscular injection of calomel, as first suggested in 1864 by Scarenzio and revived in 1885 by Neisser, it occurred to me that this plan might prove valuable in other forms of infection.* It has certain definite advantages over the ordinary methods of medication, among which are infrequent administration, precision of dosage, and promptness of action. As the calomel thus introduced into the organism undergoes gradual conversion into the albuminate of mercury, and, in the presence of the alkaline fluids of the tissues, into a double chloride of mercury and sodium, this method has the further advantage of exposing the organism to the continuous action of mercury in small amounts. It, moreover, possesses the cardinal advantages of sparing the digestive tract all direct irritation, and the certainty of absorption without regard to the state of the alimentary canal.

The calomel is suspended in a mixture of glycerin and water, and injected deeply into the gluteal or deltoid muscles under rigid antiseptic precautions. The operation is usually followed by transient pain, and by circumscribed irritation and deep induration; if properly performed, abscesses do not follow. The induration usually disappears in the course of a week. The dose of calomel injected is 1 to 2 grains; it is repeated every four or five days. I have no experience with the red oxide of mercury used in this way, nor with the "gray oil" of Lang.

ENTERIC FEVER.

CASE I.—E. G., male, æt. 31, unmarried, Italian seaman, was admitted to the medical ward of the Jefferson Medical College Hospital on the 1st of November, 1887, on the eighth day of an attack of enteric fever, contracted while aboard ship in the Delaware River, opposite Philadelphia. The evening temperature on three occasions after his admission to the ward reached 105° F.; the morning temperature range was about 103° F. The temperature fell to normal on the twenty-first day of the attack, and, with the exception of occasional transient febrile exacerbations, remained at the normal until the fortieth day. During this time, however, it was noted that the area of splenic dulness continued to be enlarged. On the fortieth day a relapse occurred, with recurrence of the rash and diarrhœa, and the febrile movement reached 103° F. This relapse was complicated by the occurrence of a large abscess in the left inguinal region. Defervescence was complete on the fifty-ninth day from the beginning of the primary attack and the nineteenth day from the beginning of the relapse. From this time convalescence was uninterrupted. Hypodermic injections of calomel in grain doses were employed in this case throughout, the administration of the dose being on several occasions followed by a distinct and permanent lowering of the temperature range.†

CASE II.—H. O., male, æt. 21, an acrobat by profession, was admitted to Ward 8, Bed 5, of the Philadelphia Hospital, on the 19th of December, 1887, on the seventh day of an attack of enteric fever. In this case the evening temperature ranged between 103° and 104° F. There was splenic enlargement, no tympany, scanty eruption, copious diarrhœa, amounting to from five to eight passages daily. The morning temperature reached the normal on the twentieth day of the attack, and the defervescence was complete on the twenty-third day. (See Chart I.)

CASE III.—J. C., male, æt. 24, born in Ireland, a laborer, unmarried, had been for a long time an inmate of Ward 8, Bed 6, of the Philadelphia Hospital, suffering from pulmonary consumption affecting the upper lobes of both lungs, with cavities. While absent from the hospital on leave in November, 1887, he contracted enteric fever. On the fifth day the evening temperature reached 104° F., and on the eighth day the rash appeared. The case was characterized by the intensity of the abdominal symptoms, splenic enlargement, tympany, moderate diarrhœa, and scanty but well-defined eruption. The temperature fell to normal on the twenty-fifth day and to subnormal ranges on the twenty-eighth, when collapse occurred, with an axillary temperature of 94.5° F. After marked oscillations, which continued for several days, the temperature range became that of the man's original condition. This case was treated throughout with calomel injections, and ran a remarkably favorable course.

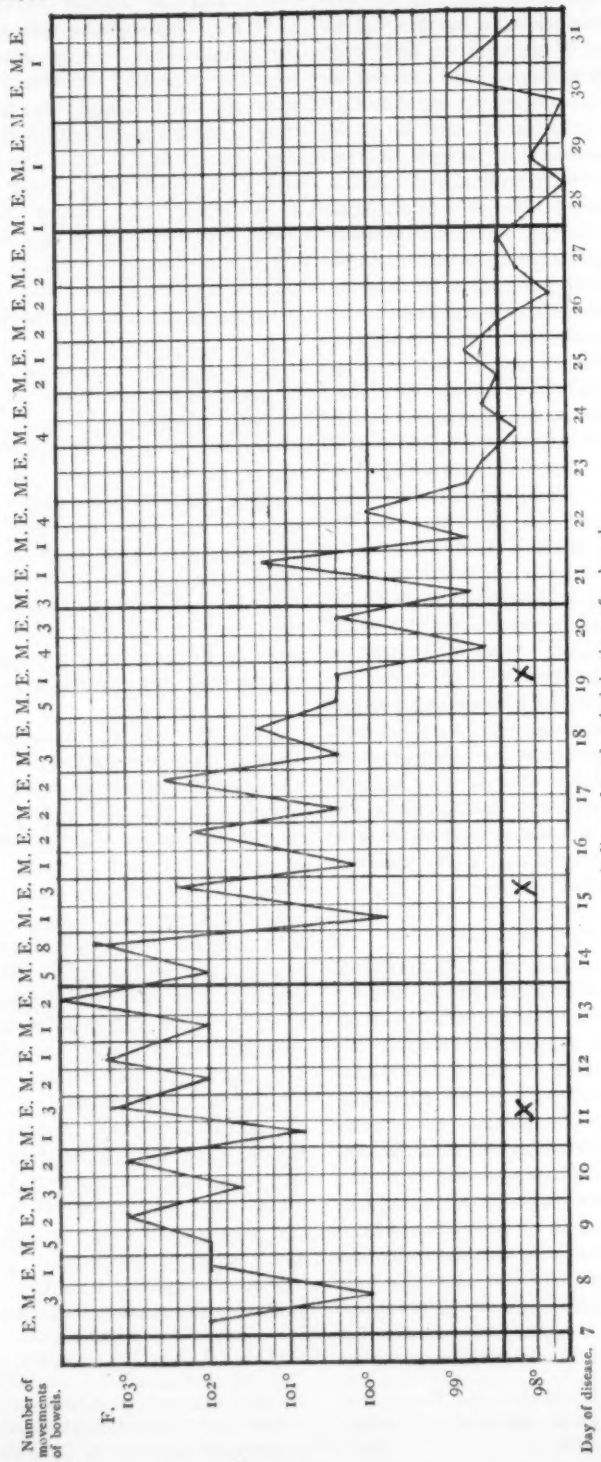
CASE IV.—D. H., male, æt. 19, laborer, ad-

* J. C. Wilson, M.D., "Note on the Treatment of Syphilis by the Hypodermic Injection of Calomel" (*Medical News*, June 2, 1888).

† The temperature charts, with the exception of those of Cases II., IV., and VIII., are not reproduced for want of space.

CHART I.

CASE II.—Enteric fever. H. O., male, æt. 21.

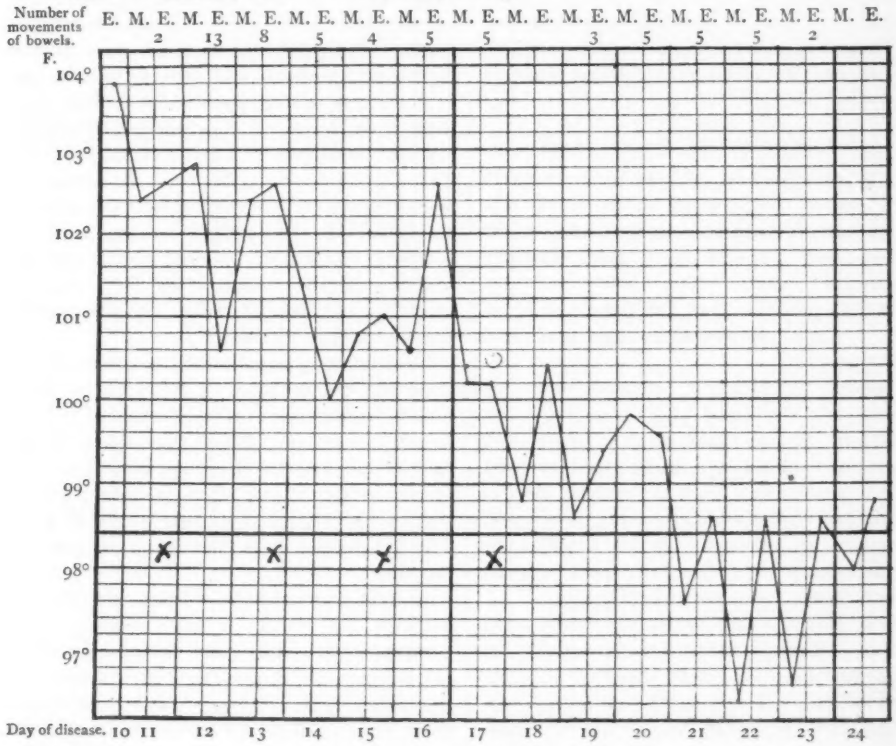

Number of movements of bowels.
E. M. E.
3 1 5 2 3 2 1 3 2 1 1 2 5 8 1 3 1 2 2 2 3 5 1 4 3 1 1 4 4 2 1 2 2 2 1 1 1
F.
103°
102°
101°
100°
99°
98°
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Day of disease.
x indicates hypodermic injections of calomel.

mitted to Ward 2, Bed 30, of the Philadelphia Hospital, on the 23d of January, 1888, on the tenth day of a well-characterized attack of enteric fever, that had been ushered in with a distinct chill. The temperature on the evening of admission was 104° F.; the following morning, 102.4° F. The patient was delirious, tongue dry and fissured, spleen enlarged, rose spots abundant, stools thin and yellow, from two to five in the course of twenty-four hours, slight epistaxis, moderate tympany.

The patient received four intramuscular injections of 1 grain of calomel each in the course of eight days following admission. Defervescence was complete on the twenty-first day of the attack, the form of lysis presenting a distinct modification of the usual type. (See Chart II.)

CHART II.

CASE IV.—Enteric fever. D. H., male, æt. 19.



x indicates hypodermic injections of calomel.

CASE V.—W. N., male, æt. 50, unmarried, a native of Canada, mechanic, was admitted to Ward 2, Bed 13, of the Philadelphia Hospital, on the 6th of January, 1888, suffering from high fever, attended by muttering delirium, with vomiting, constipation, and great prostration. No history could at that time be obtained. The febrile movement, with the exception of a period extending from the 10th to the 18th of February, continued until the 23d of March. The case proved to be one of enteric fever of a very severe type. It was subsequently learned that the sickness began two weeks prior to the patient's admission to the hospital, and was, therefore, of a whole duration, including the afebrile period already mentioned, of about ninety days. It consisted, as shown by an analysis of the temperature chart, of a primary attack, terminating about the 20th of January, succeeded immediately by a relapse, lasting until the 10th of February, and a second relapse, which set in upon the 18th of February. During the greater part of this time the patient was very delirious. A few characteristic rose spots appeared upon the abdomen during each relapse. On the 2d of February intestinal hemorrhage of moderate amount occurred. This patient, from the time of the recognition of the nature of his sickness, was treated

by calomel hypodermically. He made a complete recovery, and left the hospital at the end of May.

It is scarcely necessary to say that the foregoing cases of enteric fever were managed in accordance with accepted rules as regards diet, bathing, quietude, and the like. Cold compresses were employed, and repeated 5-grain doses of antipyrin were administered in Case V., when the temperature rose above 104° F. The other cases received no medication other than the hypodermic injections of calomel, except an occasional opium suppository, or dose of bismuth subnitrate, for the control of too frequent diarrhœa, and in one or two instances only a single dose of antipyrin.

PHTHISIS IN SYPHILITIC SUBJECTS.

CASE VI.—Widow, æt. 38; ill three years with teasing cough, attended by scanty expectoration, occasional night-sweats, slight loss of flesh, appetite fairly good, evening temperature normal. The history renders it more than probable that the patient suffered from syphilis shortly after her marriage, twelve years ago.

Physical examination revealed extensive dulness over the right lung, anteriorly in the mammary line, with abundant crepitant and subcrepitant râles heard in the infraclavicular area, and extending down the anterior border of the lung. Percussion elsewhere yields good resonance, and especially is this noted in the supraclavicular regions on both sides. Examination of the sputa showed no bacilli.

This patient came under observation the 10th of February, 1888. On the 29th of the same month treatment by hypodermic injections of calomel was commenced, and continued until the end of April, eight injections in all being administered. The area of percussion dulness was then noted to be much less extensive, subcrepitant râles were not heard, and a few crepitant râles only could be detected on forced inspiration after efforts at coughing. The patient left for her home much improved in all respects.*

CASE VII.—C. G., male, æt. 35, unmarried, an Englishman, by occupation a painter, was admitted to Ward 2, Bed 25, of the Philadelphia Hospital, on the 8th of May, 1888. Syphilis, with well-characterized secondary manifestations, eight years ago; cough and moderate loss of flesh for the past six months; five weeks ago slight blood-spitting, severe pain in the left side, diarrhœa, night-sweats, great shortness of breath. He gives an account of having been tapped three times in the left axillary region, with the removal of bloody fluid. Patient emaciated, extremely sallow, not jaundiced, moderate cough, scanty muco-purulent expectoration, containing numerous bacilli.

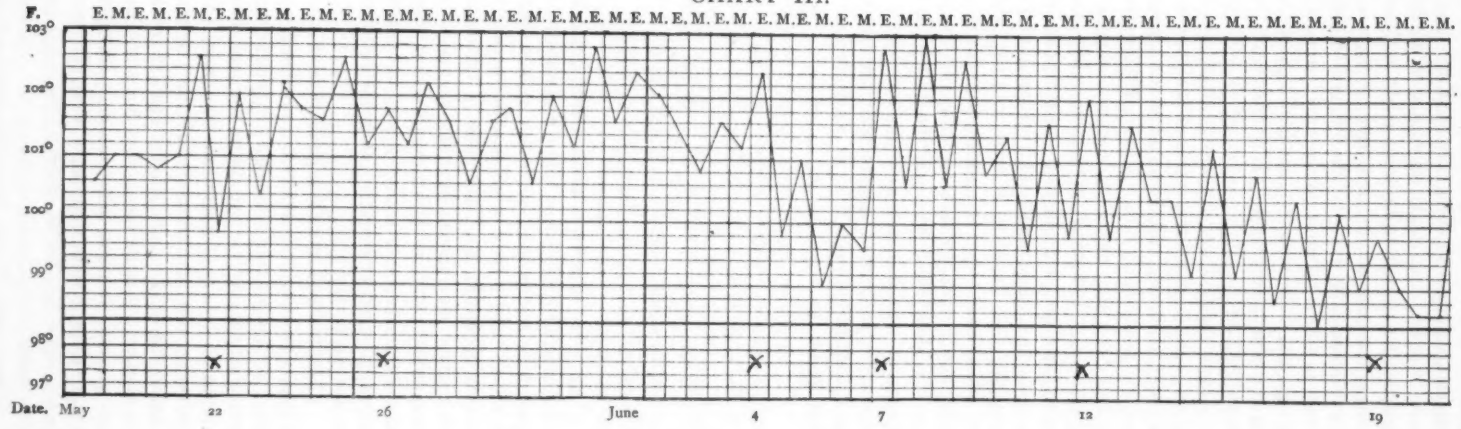
The physical signs indicated moderate tubercular infiltration of both apices, with a small cavity on the left side opposite the second intercostal space. Extensive coarse friction sound is heard over the base of the right lung, anteriorly and posteriorly, whereas, in the corresponding position on the left side, there is retraction of the chest and restricted respiratory movement without friction sounds. The night-sweats at the time of admission were profuse and distressing, and the general condition of the patient wretched. The morning temperature ranged about 100° F., and the evening temperature from 102° to 103° F.; the patient weak and depressed, unable to leave his bed.

Treatment by hypodermic injections of calomel was commenced on the 11th of May, and steadily continued, at intervals of four or five days, until the 26th of June, when the patient left the hospital of his own accord, having gained in weight and strength to such an extent that he regarded himself as a well man. The following note is taken from the hospital record:

"Great improvement, subjectively and objectively, no cough or expectoration whatever, no night sweats; for the past fortnight the temperature range has been normal. At the right apex, anteriorly and posteriorly, there are crepitant and subcrepitant râles in abundance. At the right base pleural friction sounds are no longer heard, although patient occasionally complains of sharp pains in this region on deep inspiration. The localized tympanitic percussion resonance in the second intercostal space to the left of the sternum, as previously noted, has disappeared. The dulness on the left side continues very marked below the clavicle, less so over the mammary region, but increases almost to flatness at the base. On the left side there is faint bronchial respiration, without râles anteriorly, and at the apex posteriorly. Tongue clean; patient looks well, has a good appetite, and weighs one hundred and forty pounds. The finger-nails show a series of well-marked transverse ridges."

* This is Case IX. of the series in the "Note on the Treatment of Syphilis" in the *Medical News*. It was thought to be a case of gummatous infiltration of the lung. The subsequent history is unknown.

CHART III.


F.
E. M. E. M. E. M.

This patient had no other treatment whatever except a few doses of picrotoxine for the relief of night-sweats.

PHTHISIS.

CASE VIII.—J. E., male, æt. 25, unmarried, Irish, iron-moulder, was admitted to Ward 2, Bed 27, of the Philadelphia Hospital, on the 18th of May, 1888. His illness began seven months before, after exposure, with cough and morning expectoration; has had blood-spitting in small amounts, suffered recently from chest pains, and has lost a great deal of flesh: no history of syphilis. On admission the patient was pale, much emaciated, and very weak. Cough annoying, especially at night, and accompanied by moderate muco-purulent expectoration, which contains numerous tubercle-bacilli. The chest is well formed and capacious, with the exception of localized retraction at both apices. On the right side there are the signs of large cavities in the upper lobe, with extensive infiltration of the middle and lower lobes. On the left side there is dulness, bronchial respiration over upper lobe, and coarse crepitant and sub-crepitant râles in the mammary region.

Calomel injections were begun on the 22d of May, and repeated at intervals of four or five days, 2 grains being the usual dose. On the 11th of June it is noted that the patient feels much improved, has gained considerable flesh, weighs one hundred and ten pounds; appetite good; bowels regularly moved each day; cough has entirely disappeared, except before breakfast. At this time there is slight expectoration, which contains tubercle-bacilli; pulmonary signs unchanged.

Treatment was continued until the 30th of June, when, the patient complaining bitterly of the local pain of the injections, it was stopped. At this time the temperature was practically normal. In the course of eight days the evening temperature rose to 100° F., and in a short time reached 102° F. The calomel injections were then resumed, with the result of speedily bringing the temperature range to the normal. (See Chart III.)

It must be added, though without much bearing upon the case, that this patient during some part of the treatment took at his own request teaspoonful doses of cod-liver oil three times daily.

I have thus systematically treated in accordance with this plan five cases of enteric fever, all of which were severe, and all of which recovered, three of them running an exceptionally favorable course; and three cases of phthisis, in two of which there was a distinct history of syphilis. In the three chest cases marked and rapid amelioration of the constitutional symptoms took place without very great change in the physical signs of local pulmonary trouble. In one of the two cases in which tubercle-bacilli were found, the cough and expectoration wholly disappeared. In the other case, the bacilli persisted in the expectoration.

These cases taken together constitute a clinical experiment, the result of which, considered without prejudice, has forced upon me the conviction that calomel thus introduced into the organism exerts a decided therapeutic influence in ameliorating the symptoms, and in modifying the temperature range of enteric fever and of pulmonary phthisis. In the case of enteric fever with relapses (Case V.) it is impossible to ascribe any very great benefit to the treatment. Nevertheless, those who saw the case in the wards of the hospital were of the opinion that the injections of calomel were on several occasions followed by distinct amelioration of the symptoms.

RATIONAL SELECTION OF THE SALTS OF SALICYLIC ACID FOR THERAPEUSIS.

BY W. A. CALDWELL, M.D., CHICAGO, ILL.

THE word *rational* is used in contradistinction to empirical. When a certain compound is selected for no other reason than because others have used it with success in similar troubles, such selection is empirical. But when our reasons for the selection of a compound to fill an indication for treatment are obtained from a knowledge of chemistry, physiology, and pathology, then the selection is said to be rational.

There are now quite a large number of compounds of salicylic acid used in medicine, and the number is being increased every year, and chemistry shows us that there are still hundreds of other combinations possible, only awaiting the manipulation of the chemist. Among those at present on the market for use in medicine may be mentioned the salicylates of sodium, lithium, ammonium, potassium, magnesium, bismuth, mercury, iron, zinc, quinine, eserine, phenol, methyl, propyl, beta-naphthol, etc.

These salts do not have the same action,

hence it makes considerable difference which is selected to produce a certain effect.

In presenting the basis for rational selection of these compounds I will,—

First.—State briefly and without discussion some of the probable actions of the radical salicyl when brought in contact with the tissues.

Second.—*Assume* the truth of certain propositions giving the general laws of compounds modifying the actions of drugs on the animal organism in health and disease, and then,—

Third.—Base the rational selection of the salicylates on these general laws and the action of the radical salicyl.

ACTIONS OF SALICYL.

The probable actions, so far as is known of the radical salicyl on living tissues when brought in contact with them and is free to act, are as follows :

I.—*First-Contact Actions.*

1. It hinders the action of all the enzymes of the gastro-intestinal tract, and hence produces indigestion. It also acts on bacteria, one per cent. to ten per cent. prevents their development, hence it is an antiseptic.

2. It is an irritant to mucous membranes, and produces nausea and loss of appetite not only by irritation, but also by interfering with the digestive enzymes.

3. When applied to skin-lesions and to wounds it not only acts as an antiseptic, but probably favors the healing process by its action on the white corpuscles.

Prudden has shown that solutions of salicylic acid, $\frac{1}{1000}$ to $\frac{1}{4000}$, possess an inhibitory power over the amœboid movement and the capacity for emigration of the white blood-cells, hence he thinks that it is extremely probable that a part of the favorable action of salicylic acid in healing of wounds is due to the reduced activity of the white corpuscles.

II.—*Elimination-Contact Actions.*

When salicyl is exhibited in an absorbable compound (at least those at present known) it is eliminated through all the glands of the body in whose secretions it is soluble, and in that way comes in contact with certain structures and acts on them. A large part passes out through the kidneys, where it causes more or less irritation. Cases of dangerous albuminuria have been reported, hence it should be given with caution when the kidneys are affected. It increases the water and the solids of the urine.

Huber observed a marked increase of urine in twenty-one out of twenty-five cases of acute articular rheumatism. There is often such profuse diaphoresis that the diuretic action, it seems, might be sometimes masked. In the cases of phthisis and typhoid fever, to whom Huber administered salicylic acid, the increase of urine was very slight. This may possibly be partly due to there being less water in the bodies of the emaciated.

It is also partly eliminated through the salivary, gastric, and intestinal glands, and it is probable that its action at this time is a factor in producing the nausea and loss of appetite which accompany its exhibition for any length of time. It is also eliminated through the sudoriferous glands.

I have seen no record of any experiments to determine how far the copious perspiration it excites is due to local action in the glands during elimination, or to action on the central sudoriferous nervous mechanism.

III.—*Circulation-Contact Actions.*

1. *Action on the Circulatory Mechanism.*—A small dose increases the blood-pressure by stimulating the motor ganglia of the heart, increasing its force and frequency, and by acting on the vaso-motor centre contracting the arterioles; however, if the dose is larger, sufficient for therapeutic purposes in acute rheumatism, instead of stimulation, there is depression of this mechanism. The blood-pressure is lowered by dilatation of the arterioles and failure of the heart.

2. *Action on the Respiratory Mechanism.*—At first the breathing is quickened by stimulation of both the respiratory centre and the pulmonary vagus ends, but later depression follows and the breathing is slowed and may become dyspnœic.

3. *Action on Cerebro-Spinal System.*—Very little is known about this. It circulates in the cerebro-spinal fluid, and possibly considerable of its action on these structures is due to this. It depresses the functional activity of the spinal cord. Its action on the cerebrum is in some respects similar to quinine.

4. *Action on Metabolism.*—At present there is no exact knowledge of its action on cellular metabolism. It increases nitrogenous waste in dogs to whom it is given. Animals taking it for some time emaciate. This may be due in part to its action on the digestive enzymes. It is also possible that cellular metabolism is carried on by enzymes, and that salicyl arrests their action just as it does the action of the known enzymes of the digestive tract.

Large doses given for any length of time produce profound anæmia. Prudden has shown that $\frac{1}{4000}$ produces grave changes in the red corpuscles. It in some way increases the excretion of urea and uric acid. This is very marked at first in rheumatism. In gout excretion of uric acid is increased.

5. *Action on Certain Pathological Conditions.*—It probably circulates in the blood as a salt, possibly as salicylate of sodium. Of course, while it remains a salt it does not act, as only the radicals of a compound act, not the compound. But if any agent should decompose it the nascent radical salicyl would be active as an antiseptic, and possibly in a number of other ways. It has been supposed by some that the way it acts in acute articular rheumatism is that the carbonic acid in the inflamed joints liberates the salicyl from the sodium, which then in its nascent state acts upon the bacteria (?) of rheumatism. This, however, is yet an unsupported hypothesis.

Excess of uric acid in the organism is probably "mainly due to disturbed retrograde metamorphosis" somewhere and in some way. Alexander Haig has made some experiments to show the influence of salicylic acid on the excretion of uric acid. He says that while acids usually diminish the excretion of uric acid by rendering it less soluble, salicylic acid increases its excretion by forming salicyluric acid, which is far more soluble, and hence more rapidly eliminated. In this way he explains how salicylic acid removes that form of headache supposed to be due to the irritation of excessive quantity of uric acid in the blood. However, it must be remembered that salicylates are of little service in gout.

M. Robin proposes to treat the typhoid condition with salicylic acid, because in this condition the organism is overcharged with incompletely oxidized waste, which is but slightly soluble in the fluids of the body, and hence is eliminated slowly. He thinks the salicylic acid combines with the waste, such as glycol, forming salicyluric acid, which is very soluble and rapidly eliminated. No one will doubt that a drug which will render more soluble the large and dangerous quantity of waste with which the organism is loaded in the typhoid state would be of great service in its treatment, provided it did not possess other and injurious actions which of themselves would jeopardize the life of the patient. Salicyl may render more soluble the accumulated waste and hasten its removal from the body, but it seems to me that the experiments of Prudden on its action on the red corpuscles, and its action on animals in producing emaciation when given to them for a long time, and the almost universal clinical experience of its great depression of circulation and profound derangement of digestion, and especially in the typhoid state, where the digestive glands are starved and their secretions dried up, that it is entirely unfitted to fill the indication for removal of the waste which is fast destroying the life of the patient. Chemists and therapeutists should search for a drug which will render these products soluble and secure their rapid elimination from the organism, but it should be devoid of those untoward actions which salicyl possesses.

Jaksch believes that salicyl acts as a specific in scarlatina and puerperal fever as much so as in rheumatism. Grabham, Hillaby, and others in England believe that it has a specific action in tonsillitis. In health it has very little power to reduce temperature, but in fever it is a powerful antipyretic. At present nothing is known of how its acts on the thermogenetic mechanism.

Bearing in mind the normal and morbid physiology of the animal organism, the above actions show that salicyl has several useful actions, but also a number which are equally injurious. It is useful in certain morbid conditions because it retards microbic growth, lessens certain pathogenic processes, promotes nitrogenous excretion, but at the same time it must not be forgotten that it arrests the action of the digestive enzymes, deranges cellular metabolism, irritates the kidneys, and depresses the action of the circulatory and respiratory mechanisms. In certain diseases the salicylates are indicated, and if the patient is strong enough to stand the damage to digestion, etc., then they are of service; but if the patient is pale, anæmic, and emaciated, they may sometimes do harm, because the system cannot stand any further depression of these powers. Hence in phthisis, delicate rheumatics, and during the latter stage of the typhoid they often do harm.

The *assumed* propositions may be formulated as follows:

1. Compounds do not act upon the tissues, but the radicals of which they are composed.

2. Compounds insoluble at a certain point cannot enter the circulation from that point, hence,—

(1) Compounds insoluble in dilute acids and in the presence of pepsin cannot be absorbed from the stomach during gastric secretion.

(2) Compounds insoluble in dilute alkalies

and in the presence of duodenal ferments will be precipitated on entering the duodenum, and cannot be absorbed from there.

3. Compounds insoluble at a certain point are usually non-irritant at that point.

4. Drugs can only act on the tissues when in contact with them (action transmitted over the nerves is not considered here), hence,—

(1) Insoluble compounds can have only a local action.

(2) Absorbable soluble compounds can act both locally and at other points after entering the circulation.

5. The compound affects the action of the drug on the organism:

(1) By determining the solubility, absorbability, diffusibility, and stability.

(2) By the action of the other radical.

When a radical is combined with another for therapeutical use some of the reasons are:

1. To secure its local action only, when its action after entering the circulation would be of no use and might be toxic. This is accomplished usually by forming a compound insoluble in the menstruum.

2. To render it absorbable so that it can enter the circulation and act at various points where it is carried by the blood-stream.

3. To prevent injurious local effects on the mucous membrane or on the digestive ferments. The action of a certain drug may be indicated to act after entering the circulation, but the compound may be such that at point of absorption it produces so much disturbance that it cannot be used.

4. To render it absorbable from a certain point. For certain reasons sometimes it is desirable to have the drug absorbed entirely from the stomach or entirely from the duodenum.

5. To secure the action of the other radical.

With these data I am now prepared to consider from a rational basis the therapeutic value of the various salicylates now on the market and their adaptability to fill certain indications for treatment in disease. The classification of these salts which I will use here is simply for convenience of presentation, as in nearly every case the combination is for more than one purpose, and hence would necessitate repeating them several times were I to follow the indications for combination given above. So I will arrange them according to the most important indications for combination, and which may be briefly stated as follows:

1. To prevent unpleasant action on the stomach. Example of which is salicylate of phenol.

2. To secure local action. Example, salicylate of bismuth.

3. To secure action after entering the blood. Examples, salicylates of sodium, lithium, ammonium, methyl.

4. To secure action of another radical. Examples, salicylates of mercury, iron, magnesium, eserine, and quinine.

SALOL.

In rheumatism and other diseases the exhibition of the radical salicyl is indicated to act after entering the blood. But when given as salicylic acid by mouth it soon produces serious disturbance of the stomach. To obviate this salicylate of sodium was made, which is less irritant to the stomach but still objectionable.

Next, chemists began to look for a salt which would pass through the stomach undissolved and without irritation into the duodenum, and from there enter the circulation.

Salicylate of phenol or salol is the result of these investigations.

Salol is insoluble in the acid gastric juice, but after entering the alkaline duodenum it is split up into carbolic and salicylic acids, and the salicyl probably enters the blood as salicylate of sodium.

Sahli and Nencki believe that salol is decomposed by the pancreatic juice, by the alkaline carbonates, by bacteria, and by inert organic matter.

Lombard, from experiments made on animals, concludes that the quantity of salol absorbed depends on the quantity of pancreatic juice present in the duodenum, and that if there is an excess of salol it will pass out of the body undissolved. He says if the pancreatic duct is tied, salol is not absorbed. If this be true it may explain why salol sometimes is not effective and also suggest how to secure its absorption.

In diseases where there is little pancreatic juice secreted, and when pancreatic secretion has ceased after duodenal digestion is finished, and where the fever patient takes very little food to excite pancreatic secretion, salol would be very slowly absorbed, hence pancreatin, bicarbonate of sodium, at such times might aid its absorption, but they should be given later, as they would have a tendency to split it up in the stomach. Food also would aid its absorption, but the broken-up salol would interfere with duodenal digestion.

Sievers and Ewald, after ligaturing the

pylorus of a dog and rendering the stomach alkaline by large doses of bicarbonate of sodium, then introducing salol into the stomach, found its components in the urine, showing that the acids had entered the circulation from the stomach. This suggests that in certain pathological conditions of the stomach, and during gastric rest when the mucous membrane is alkaline, salol may be decomposed in the stomach, producing nausea, just as salicylic acid. But the fact that it may be decomposed by the secretion from the mucous glands of the stomach makes salol of great service in that condition of excessive mucous secretion called gastric catarrh. For this condition salol is better than the acid or sodium salt, because it is insoluble till it acts on the mucus, while the others are soluble and free to act on the mucous membrane, and also enter the circulation, where it is not indicated. The carbolic acid, of course, is also of service. It seems to be a tolerably general experience with clinicians that salol also in time produces some nausea, though much less than the acid or sodium salt. The nausea may be due in part to reflex irritation from the duodenum, but very likely the action of the salicyl in elimination-contact in the stomach and salivary glands is the main factor, except when it is decomposed in the stomach.

Any compound of salicyl which is eliminated through the glands of the stomach will likely produce some nausea. It also seems to be the experience of a great many that salol is a little slower in its action than salicylate of sodium, and this might easily be inferred, for very little absorption takes place till it reaches the duodenum; the absorbing surface is limited to the duodenum and, besides, it has to be split up first, which process at times may progress slowly.

Some of the various uses of salol are:

1. To remove certain morbid materials from the system. It of late has been used in preference to the alkaline salicylates to act after entering the blood, in acute and chronic rheumatism, myalgia, sciatica, wry-neck, certain forms of neuralgia, and headache due to excess of uric acid. I have lately given salol, 20 grains every two hours till relieved, to two patients suffering from this kind of headache. They felt better in two hours, and three or four doses a day entirely relieved them.

Rosenberg thinks, so far as its systemic action is concerned, that the carbolic acid is a drawback rather than an advantage on account of the carboluria.

2. To act as an antiseptic in the intestinal canal. Herlich some time back suggested that it was a feasible way to introduce carbolic acid into the intestine; hence in this age, when microbes are believed to be the cause of most intestinal troubles, it was not long before it was used for intestinal catarrh, tuberculous ulcers, diarrhœa, and typhoid fever. Dr. O. T. Osborne reports a large number of cases of diarrhœa which he has treated successfully with salol. Dr. Eichberg, of Miami Medical College, says that while salol is of service in diarrhœa, yet its antiseptic action seems to pass off rapidly, so that often it became necessary in the cases he treated to resort to other remedies. The decomposition, he thinks, takes place so high up in the canal that the acids are absorbed before reaching the lower part of the canal.

It seems to me that salol would not be of much service in treating lesions of the colon except by injection per rectum. Dr. James Barnsfather reports good results in typhoid fever from its use in 3-grain doses every three hours. He thinks it has a powerful action on the ptomaïnes in the intestinal canal. Professor Jaccoud says it often increases the delirium of typhoids. Others report that it specially deranges the stomach in typhoid fever.

It seems to me that its interference with digestion, its production of anæmia and deranged metabolism, would more than balance its advantages as an antiseptic in the intestinal canal of the weak and emaciated typhoid.

3. To act as an antiseptic in cystitis and pyelitis. Fielchenfeld found salol of great service in catarrh of the bladder, rendering the urine acid, increasing the urinary secretion, and diminishing the pus. It is said to be of great service in myelitis, with paralysis of the bladder and alkaline urine.

4. To act as an antiseptic in the treatment of wounds, ulcers, etc. There is difference of opinion as to the antiseptic power of salol. Nencki believes that it is as pronounced an antiseptic as salicylic acid.

To determine its antiseptic action M. Pinet has introduced equal quantities of salol and salicylic acid respectively into test-tubes containing putrid fluid from a frog's leg. He reports that the salol does not arrest the process, but that the salicylic acid does. There is no doubt that salol is an antiseptic when it is decomposed, and equally true is it that it is not an antiseptic when it is not decomposed. It is the same with iodoform,—if it does not decompose it does not act. It is probable that pus and the discharges from

wounds slowly decompose salol, hence it is a mild continuous antiseptic, not so active as salicylic acid.

5. To act as an antipyretic. There are other drugs more powerful than salol, and without the injurious actions, hence, with the exception of its use in rheumatism, it is very little used as an antipyretic. Later, and in another paper, I hope to be able to present some experiments on the absorption of salol.

SALICYLATE OF BISMUTH.

The salicylate of bismuth, like the subnitrate, is almost insoluble in the intestinal canal, hence its action is local. Dr. Hale says it is of great service given in ½-drachm doses every two hours in inflammatory affections of the gastro-intestinal tract. He reports good success from its use in diarrhœa of phthisis, cholera morbus, acute dysentery, diarrhœa of enteric fever, and dyspepsia with acid eructations. He thinks its action is astringent and antiseptic. Ehring gives the salicylate of bismuth in intestinal catarrhs of infants. He considers its action astringent and antiseptic, arresting fermentation. Solger has treated with salicylate of bismuth a great many cases of chronic diarrhœa, intestinal catarrh, and diarrhœa of phthisis. He thinks that it is not simply the astringent power of the bismuth, but also the antiseptic action of the salicyl. He says large doses do not irritate the stomach. It is probable that very little, if any, of the salicyl enters the circulation. It would seem, though, that there must be chemical decomposition for the radical salicyl to act as an antiseptic.

SALICYLATES OF SODIUM, LITHIUM, AMMONIUM, AND POTASSIUM.

These salts are so well known that I shall only mention them. They are all soluble and readily enter the circulation in large part from the stomach. After entering the circulation each base has its own specific action. Vulpian is said to regard the lithium salt as better than the sodium salt in chronic rheumatism on account of the action of the lithium. Dr. Fliesburg, of Hudson, Wisconsin, speaks very highly of salicylate of ammonium in pneumonia, capillary bronchitis, and the zymotic fevers. However, I think there are other antipyretics far better in such diseases.

So far as the salicyl is concerned, it acts in this salt just as it does in the others of this group. And it seems salicyl has so many injurious actions that it is unfitted for such cases, while if ammonium is indicated it can be easily administered. Salicylate of ammonium might be exhibited in acute rheumatism where ammonium is indicated. The salicylate of potassium probably is inferior to the sodium salt, because it is known that large quantities of potassium paralyze muscle.

None of these salts are antiseptic either in the gastro-intestinal canal or in the blood-stream.

SALICYLATES OF METHYL AND PROPYL.

Professor H. C. Wood says when salicylate of methyl is introduced into the organism CH_3 is removed by oxidation having salicylic acid. This likely becomes a sodium salt. Professor Flint says ol. gaultheria was used on thirteen cases of rheumatism in Bellevue Hospital, and produced less nausea than the acid or sodium salt; 10 drops were given several times daily. This dose is very small, and that may be the reason there was no nausea, or it may be the oil is not split up in the stomach, and hence only irritates by action during elimination, a small part being eliminated by the gastric glands as salicylate of sodium. Dr. D. H. Lake, while interne in the Philadelphia Hospital, treated a large number of cases of articular rheumatism with ol. gaultheria,—10 to 20 minims every two hours. He concludes that it acts as promptly as the sodium salt, that it is not so depressing, but that there is considerable gastric irritability. The salicylate of propyl has such a fishy odor that it has been used very little.

SALICYLATE OF MAGNESIUM.

Desplats and Vulpian once claimed that salicylate of bismuth was useful in typhoid fever, on account of its antiseptic, antipyretic, and antidiarrhœic actions. Hurchard later thought that at times the antidiarrhœic action was an objection, because free movements carry off much of the infectious material. Hence he proposed salicylate of magnesium, and reports a large number of cases which he believes were greatly benefited by its exhibition. He says it diminishes the swelling of the abdomen and odor of the fæces. He gave from 50 to 100 grains daily without any disagreeable accompanying symptoms. It is freely soluble in water and hygroscopic. Theoretically, it seems that the salt ought to have powerful antiseptic action in the intestinal canal, and without any systemic action, because it is freely soluble in the intestine, and is likely split up into the base and acid, so that the salicyl is free to act on the contents of the canal; and yet with all

its solubility and activity in the intestinal canal it very likely does not enter the circulation, except in very small quantity and very slowly, on account of the low diffusibility of the intestinal fluids produced by the magnesium. It seems that salicylate of magnesium ought to be a valuable drug for removing septic material from the intestinal canal, and hence would be of great service in diarrhœa due to microbes.

SALICYLATES OF IRON, ZINC, QUININE, AND ESERINE.

The salicylate of iron (prepared by E. Merck) is a black powder, almost wholly insoluble in water, in dilute hydrochloric acid, and in dilute solution of bicarbonate of sodium. It probably passes through the intestinal canal unchanged, and hence is very likely of little service in the treatment of the anæmia of rheumatism.

In anæmic and poorly-nourished patients suffering from rheumatism Solis-Cohen for five years has been using the following prescription:

℞ Sodii salicylatis, ʒiv;
Glycerini, ʒii;
Ol. gaultheriæ, ♏xx;
Tinct. ferri chloridi, ʒiv;
Acidi citrici, gr. x;
Liq. ammonii citratis, ad ʒiv. M.
Sig.—ʒi several times daily.

The ample material of the out-patient department of Jefferson Medical College Hospital has abundantly confirmed his expectations of its usefulness in such cases. In this mixture is probably the citro-salicylate of iron and ammonium, which is slightly soluble in water, and freely soluble in water and glycerin. There is probably nothing to be gained by this salt over the tinct. of iron and salicylate of sodium, except that it saves prescribing two bottles of medicine, which, of course, from a practical point, has its advantages, and which are considerable, hence it is a useful prescription.

Dr. W. F. Waugh speaks very highly of the sulpho-carbolate of zinc in summer diarrhœa, and it may be that the salicylate of zinc would be of service in such troubles. However, I have seen no reports of its use. I have never seen the drug, though it is on the market; salicylates of the cinchona alkaloids are also manufactured. I have never used them. The salicylate of eserine has been used in ocular therapeutics in place of the sulphate. The amount of salicyl contained in it is too small to have any appreciable antiseptic action. Its only advantage, if it has any, is that the nascent salicylic acid is less caustic than the nascent sulphuric acid.

SALICYLATE OF MERCURY.

I have made four salicylates of mercury,—two mercurous and two mercuric salicylates. The salicylate of mercury that I shall here consider is a mercuric salicylate in which two atoms of hydrogen were replaced by mercury. I made it by double decomposition of mercuric nitrate and a salicylate of potassium in which the molecule contains two atoms of potassium. Ordinary salicylate of potassium on the market contains only one atom of potassium. This salt is made by E. Merck. It is a white, amorphous powder, odorless and tasteless. It is slightly soluble in water, and freely soluble in carbonate of sodium or potassium, only very slightly soluble in dilute hydrochloric acid. The greater part of it probably passes through the stomach undissolved into the duodenum, where the alkaline menstruum possibly dissolves it preparatory for absorption. This is purely a hypothesis. No experiments on absorption have been made so far as I know. However, the clinical experiences of Drs. Arango and Chaves, of Rio Janeiro, and Dr. Inge, of Mobile, somewhat suggest this. Some of their conclusions may be stated as follows:

1. It is supported easily by the stomach without any bad effects.

2. It does not cause mercurial stomatitis.

3. It is effective when the bichloride has no effect. If the most of it passes through the stomach unchanged, it would produce less gastric disturbance than if it were dissolved in the stomach.

Often the bichloride, after weeks of its continuous exhibition, becomes ineffective, not only because it is an irritant, but mainly because it is daily arresting the action of the pepsin, and thus it gradually interferes with digestion, and hence nutrition. Some persons who have strong digestive organs may not be affected by this, but the weaker will suffer, cellular metabolism will be depressed, and the treatment will do no good. It is in such cases that hypodermic injections have been of great service, and it may be that the salicylate of mercury, because it is an organic salt, and because it is mainly absorbed from the duodenum, will succeed where the bichloride deranges digestion, and for that reason fails. Its action may, so far as its organic radical is concerned, be compared with that of the vegetable salts of iron. In anæmia

iron is indicated, but in certain cases the astringent chloride may irritate the stomach so much that its exhibition will do more harm than good, while one of the vegetable salts will be well borne and improve the patient.

It is possible that some other organic salts of mercury might have advantages. I have made the citrate of mercury and tartrate of mercury (mercuric). It is probable that the citrate or tartrate of mercury and potassium would be more soluble in water. So far as the chemical reactions suggest anything, it appears that these salts would be inferior to the salicylate, because these in the test-tube behave as the mineral salts of mercury, while the mercuric salicylate containing two atoms of mercury has entirely a different class of reactions; as an example, it is soluble in alkalies, which property gives it advantages in medicine over other known salts of mercury. This property is due to the fact that an atom of mercury replaces the atom of acid hydrogen in OH, making a salt entirely different from the salicylate, in which only the atom of hydrogen in CO_2H is replaced. If salicylate of mercury is of any service in syphilis it is not on account of the action of the radical salicyl, as it is in entirely too small quantity to have any appreciable action, but simply in its use in forming an unirritating compound and one absorbable from the duodenum mainly. The doctors mentioned speak very highly of its use in an ointment not only for syphiloderma but for other skin-lesions, and for a collyrium in eye-diseases. It is very likely less corrosive than the mineral compounds of mercury, because nascent organic radicals are not so destructive to tissue as the mineral. The experience of the doctors quoted is that it does not produce stomatitis unless the dose be excessively large. Of course the stomatitis is produced by its action during elimination through the glands connected with the buccal cavity. If mercury circulates in the blood as an albuminate, I see no reason why the form of mercury absorbed should affect its power to produce stomatitis. But if the salicylate circulates as the salicylate and the bichloride as the bichloride, it is much easier to imagine that the nascent chlorine would be more irritating to the gums and glands than the salicyl. As for the confirmatory clinical experience, it may be mentioned that K. Schadek, of Germany, says that salicylate of mercury is no less active than other preparations of mercury, besides it produces no unpleasant local effects and systemic disturbance, which so often occurs with the bichloride. As salicylate of mercury is only slightly soluble in water, that is an objection to its use in antiseptic solutions, unless they be made alkaline. Like iodoform and salol, probably when brought in contact with pus and putrid discharges it may be split up and act as an antiseptic. I have not read of any experiments on its antiseptic action.

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Where I have not been able to see the original paper I have mentioned the journal in which I saw the extract.

168 South Halsted Street.

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*SUGGESTIONS REGARDING THE MANAGEMENT OF PHTHISICAL PATIENTS AT HEALTH RESORTS.**

By Isaac Hull Platt, M.D., Lakewood, N.J.

THIS paper is intended merely as a note calling attention to some mistakes which I have observed in the conduct of patients in search of health, presumably due to lack of proper instruction from their home physicians, and also to some measures of treatment which I have found useful in the cases of such patients. This statement will, I hope, serve as an apology for the lack of scientific method and completeness in what is to follow.

The factors in the etiology of pulmonary phthisis are so many and so complicated that it is usually impossible to determine the precise chain of causes which result in the disease. To remove a patient from the environment in which he has lived, and in which he has contracted the disease, or developed a predisposition to it, and place him under conditions as far removed as possible from those under which he has been living, might very likely result in benefit, by removing the unknown cause of disease among the other conditions of the patient's former life. But from the fact that good may be done by this arbitrary method it must not be concluded that much more advantage might not arise from a judicious and rational use of the elements of climate.

The proper application of climatic treatment depends upon two things: first, the selection of the proper climate, and, second, the direction of the invalid's life while away from home, so as to secure the greatest amount of good from the changed conditions. Dr. Knight has recently given us some good advice upon the former of the subjects, and it is of the latter which I wish to speak.

For the past two years I have been so situated as to observe the doings of many invalids, sojourning away from home for their health; I find that, as a rule, they come without any special directions from their physicians, believing that the change of air will be a cure for their troubles, no matter how they conduct themselves. Or they come with certain directions from their physicians, which they follow implicitly, very likely under conditions which have altogether changed since the directions were given, and where they may do more harm than good. As an example of the latter class, I may cite the case of a lady who was told by her physician to go to Lakewood and take cod-liver oil, which she did. After about a month she consulted me. I found her in the third stage of phthisis, much emaciated, cough very severe, temperature 103° to 104° in the afternoon, and her stomach in such bad condition that she vomited every day. In spite of all which she continued conscientiously to take her cod-liver oil, and vomit it; and, believing that exercise and pines were good for her, walked about two miles every day, to and from the pine woods. A week of rest from the cod-liver oil and the walking, with a little tonic and antipyretic treatment, restored her stomach to comparatively good condition, brought her temperature down to 100° as the daily maximum, and rendered her tolerably comfortable. She was then sent home, as her disease was so far advanced that that seemed to me to be the best place for her.

The most frequent errors which I have observed on the part of invalids have been the frequenting of hotel parlors, very likely close and overheated, during the evening, remaining within-doors, probably in their sleeping-rooms, during the daytime, overexertion, and the use of drugs which are unsuited to their condition, although, perhaps, proper enough when prescribed.

If I understand the objects in a change of climate correctly, they may be classified somewhat as follows: *First.*—The influence of the rarefied air of high altitudes, which has an undoubted beneficial effect upon properly-selected cases, probably by increasing respiratory activity. *Second.*—The substitution of a purer and consequently more nearly aseptic atmosphere for that in which the patient has lived. *Third.*—In case the patient is a resident of a city, the opportunity of spending a greater portion of the day in the open air. *Fourth.*—The escape from the conditions under which the disease has probably developed. *Fifth.*—The mental and moral stimulant of change *per se*.

It will be seen that, with the exception of the first and last, they are negative; that is, they are attempts to escape from unfavorable

* Read before the American Climatological Association, composed of American physicians and surgeons, Washington, September 20, 1888.

conditions to those less so. High altitudes seem suited to those cases retaining a certain amount of vigor, in which the heart is sound, and in which the disease has not progressed too far, and where the bronchitis or nervous irritability are not too great to endure the highly-stimulating atmosphere. Cases suited to this form of climatic treatment require little or no medicine, should remain as much as possible in the open air, should practise mountain-climbing, one of the most potent adjuncts to the expansive action of the rarefied air, stopping, of course, short of overfatigue.

Under the second head, the obtaining of pure air, it would seem as though it ought to be unnecessary to protest against the supposition that pure air can be found in an overcrowded ball-room or in a close sleeping apartment, and yet experience proves otherwise. Closely connected with the subject of fresh air is that of exercise. In the city it is almost impossible to obtain such comparatively fresh air as exists there without what, for an invalid, is overexertion. He may take a drive of an hour or two, and, if strong enough, a walk. But as people do not care to sit on the front steps or in the back yards of their residences, the greater part of the time will be spent indoors. The mere fact that in the country one can live an out-of-door life is, in my opinion, one of the greatest sources of benefit in climatic change. In the case of a person whose strength is not at all or but little impaired by disease, it is well to combine exercise with the out-door life. Mountain-climbing, horseback-riding, tramping, tennis-playing, here have their place, but as a rule the matter of exercise is overdone, and I have frequently observed debilitated invalids squandering their little store of strength by overexertion. The problem in these cases is to continue the maximum of out-door life with the minimum of exertion. In the summer or a semi-tropical climate, where invalids can sit or lie in hammocks or on cots out of doors all day, the problem solves itself, but in colder climates in winter it requires some management. If I were designing a sanitarium or hotel at a winter resort, I should have it constructed upon the following plan: The house should stand upon a southern slope and, of course, face the south. Across the front should be a veranda, which, instead of being enclosed to form a sun-gallery, as is the usual custom, should be open to the south, but protected at the east and west ends by glass screens. If the veranda were of considerable length, I should in addition place similar screens across it at intervals of twenty or thirty feet, to prevent any sweep of the wind along its length. Except in special cases, where the larynx or bronchial tubes are extremely sensitive, an invalid could sit upon a veranda constructed in this fashion in the coldest weather; and even without any special construction, I have seldom been unable to find sheltered nooks where invalids could sit, even in midwinter, wrapped up as if for a sleigh-ride, if necessary, with perfect comfort and great benefit; nor have I known any cases where harm has resulted. Those cases where the laryngitis or bronchitis is too severe for this treatment should go to a warm climate, if anywhere away from home. Patients should accustom themselves to sleep with open windows, which may necessitate having their apartments warmed at night. In short, they should remain in the open air as much as possible, thus carrying out the principle of Dr. Dettweiler's sanitarium, where such excellent results are obtained.

Under the head of the mental and moral effect of change arises the question of sanitaria. The discussion of the comparative advantages of sending patients to sanitaria or allowing them to select their own places of residence, I have left to my friend Dr. Kretzschmar, who has made a study of the subject, and is much more competent to speak of it than I. I will, however, suggest that while it is most certainly desirable in many cases that patients should be under close watch and their daily lives regulated in all their details, yet the close association with other invalids is very depressing in its mental and moral aspect. However situated our patient may be, all that is practicable should be done to make him forget his illness and enjoy himself, thus giving him the benefit of a rational mind cure.

In dealing with phthisis pulmonalis we are fighting against odds, and it is important to seize and hold every vantage-ground possible, and to bring into action every weapon which our therapeutic arsenal supplies, and the fact of our having adopted the plan of climatic treatment is no reason for dispensing with any other means of combating the disease.

With regard to the question of climatic treatment applied to phthisis, our patients may be grouped in three general classes: *First.*—Those who are merely threatened with the disease or, having developed some slight signs, do not suffer from much constitutional disturbance, pyæmia, or loss of strength and appetite. *Second.*—Those in whom the disease is more advanced, who have become to some degree emaciated and debilitated,

who may be suffering from pyrexia or anorexia, in short, who are actually ill, and yet not beyond the hope that climatic change with judicious treatment will result in alleviation or arrest of the disease. *Third.*—Those cases where advanced destructive changes in the lungs, combined with evidences of rapid progress of the disease, show them to be hopeless, and render it improbable that change of climate will do sufficient in the way of alleviation to recompense them for the loss of home comforts.

The first class consists of those cases of which I have spoken as most suitable for high altitudes and an out-door life. They should receive instructions to spend their time as much as possible in the open air and to take exercise suited to their strength, the best form of which, for those who are strong enough to endure it, is, undoubtedly, mountain-climbing, from its action in expanding the lungs. In these cases, as in all others, the place selected should be one where there is no stint of good, wholesome food. Beyond attention to these points this class of cases should not need much treatment, but they should be instructed to seek medical advice upon the first appearance of any new development.

Of the third class of cases, those with advanced disease, it is unnecessary to say anything, as they are not proper subjects for climatic treatment. The intermediate class is the one requiring the most careful and judicious management. If it is decided to send a patient of this class away from home, it is essential in the choice of a place to consider not only the suitability of the climate to the patient's condition, but the character of his proposed surroundings with regard to comfort. He should, of course, have as good, wholesome, and appetizing food as possible; his sleeping apartment should be large and airy, should receive plenty of sunlight, and should be furnished with an open fireplace. The appointments and surroundings of the house which is to be his temporary home should be as cheerful and pleasant as possible, and should be furnished with spacious, sunny verandas. These seem like truisms, but they are none the less important, and none the less neglected. Good drives and a good livery are essential for patients who are not strong enough for much tramping, and are desirable for those who are.

No place, however desirable in other respects, is suitable for these patients unless supplied with a reliable physician; one to whom the home physician feels that he can confide the care of his patient; for it seems sufficiently evident that a person suffering from a serious chronic disease should not be at a distance from good medical attendance. He should be instructed to report to the local physician upon his arrival, even if in no immediate need of treatment, in order that the latter may become acquainted with his history and general condition.

The general management of patients at health resorts does not differ materially from the home treatment, except so far as it involves the use to their best advantage of the increased facilities. The main points to be observed are to obtain the greatest amount of fresh air, the fullest lung expansion, and the best possible nutrition. Means to the attainment of these ends, together with the treatment of symptoms as they arise, is the writer's idea of the proper management of phthisis. With regard to fresh air, the problem is the one already mentioned, to induce patients to remain in the open air without tiring themselves by overexertion. It takes some little time to make people believe that they can sit in the open air in cold weather without taking cold, but when they once try it, properly protected from wind and cold, they are usually so much pleased with the result as to require no further urging. I am in the habit of keeping my phthisical patients out of doors as many hours of the day as possible, of having them sleep with open windows, and instructing them to allow the windows of their chambers or living rooms to remain open whenever they are not occupied, to allow of thorough ventilation. This is the nearest approach to an out-door life that I have been able to bring about, and I have been well pleased with the results; but a plan by which a continual out-door life can be led, without too much exposure, is undoubtedly a *desideratum.*

Lung expansion can be best accomplished in those cases where the patients are strong enough for mountain-climbing and other forms of active exercise, but, unfortunately, few of our patients are capable of the exertion, and then our last expedient is to fall back upon passive expansion by means of the pneumatic cabinet, or what I regard as equally efficacious and prefer upon the score of simplicity and cheapness, Dr. S. Solis-Cohen's modified Waldenberg compressed air apparatus. This apparatus I have combined with a slight modification of Semple's atomizing inhaler, by means of which an exceedingly fine nebulized fluid is suspended in the com-

pressed air and inhaled with it. In this manner I believe that a fluid can be carried farther into the air-passages than by any other of which I know.

To accomplish the best possible nutrition of our patients is undoubtedly the most important indication of treatment, but one of the most difficult to fulfil. Of course, the first thing to be attended to is to see that the table fare is good, wholesome, nutritious, and appetizing. If insufficient nutrition is accomplished by this means, it must be supplemented by milk or milk and beef powder, or one of the reliable preparations of beef peptinoids, taken between meals. If this cannot be persisted in, owing to gastric catarrh or indigestion, resort should be had to gavage, practised twice or thrice daily, and when there is much gastric catarrh lavage once a day. Lavage and gavage undoubtedly form our most powerful means of increasing nutrition, and a case seldom occurs where they are not well borne and the results well marked. In any case of forced nutrition, however, it is necessary to give the digestive organs a few days' rest occasionally when they show signs of fatigue. In regard to gavage, I find it much more easily borne and equally efficacious when performed with the small short tube with a forcing-bottle as described in Dujardin-Beaumetz's "New Remedies," than when the stomach-tube is used.

GUNPOWDER—ITS THERAPEUTIC USES AND PROPERTIES.

By H. Valentine Knaggs, F.R.C.S., L.R.C.P., London, England.

To me it seems strange that the compound designated as gunpowder has not been more resorted to for medicinal purposes in days gone by. This is especially striking when the activity, undoubted efficacy, and non-poisonous character of its ingredients are taken into consideration. Its three components—nitre, sulphur, and charcoal—also are separately in daily use for the treatment of a variety of disorders.

As a matter of fact, its employment has been chiefly confined to certain of the ignorant and poorer class of the community, who find in it a cheap and, no doubt, efficacious remedy for every-day ailments, such as coughs, colds, asthma, and the like. Moreover, if we except those troublesome injuries caused by reason of its explosive properties, it is really no exaggeration to say that the average practitioner of medicine knows absolutely nothing about gunpowder.

Probably the name that it has borne for so many centuries, and its intimate association with war, bloodshed, and other horrors, has much to do with prejudices against it. Recently it has been deemed advisable, in view of popular feeling, to discontinue the use of the word nitroglycerin, and to substitute in its place the term glonoin and other synonymes. It would, I believe, be an equally good plan to modify the word under consideration. The pulv. potassæ nitratis co., or pulv. nitri co., might be suggested as alternatives. The article might be further modified, and at the same time rendered comparatively innocuous, by wetting the commercial compound; then drying and converting it into a fine powder. In this state it would be best adapted for medicinal purposes.

Gunpowder is generally stated to consist of fifteen parts of nitrate of potassium, three parts of sulphur, and two of wood charcoal, but the quantities vary considerably according to the particular uses for which the substance is required. The purity of the charcoal has some influence in this respect, and Pereira tells us that the superior projective force of British powder depends on the use of such woods as the dogwood, the common alder, and the willow, which are indigenous to that country. Sulphur, however, appears to be the ingredient that exerts most influence in modifying the action of this explosive, for it is stated that the proportion of sulphur ranges from ten to twenty per cent. according to whether it is required for war, sporting, or blasting purposes.

Although many interesting articles have been published from time to time on the history of the discovery of gunpowder, the name of its actual discoverer is still involved in obscurity. In Chambers's *Edinburgh Journal* for 1842 will be found an article devoted to the discussion of this topic. Berthelot, in his treatise on explosives (New York, 1883), also gives a very concise account of its early history. Similar writings may be extracted from many other sources, but they need not detain us here.

The chemistry of the compound has also been carefully taken up. In Ure's "Dictionary of the Arts, Manufactures, and Mines," published in 1867, a well-written article on many points connected with its chemistry will be found; and in the *London Medical Gazette* for 1847, Professor Faraday contributed a very complete paper on the same subject.

From a therapeutical point of view there is scarcely a medical work or journal of this century that contains any mention whatever of the use of this body in medicine. At least I have failed to discover any. Dr. Neale, in his "Medical Digest,"—an index of many of the principal British journals,—gives absolutely no references to such. There are, however, not a few remarks on accidents caused by the precipitate explosion of gunpowder in the hands of youths and inexperienced or careless persons, and of the best means of dealing with them so as to avoid subsequent disfigurement. It would be foreign to the purpose of this article to discuss the details of such injuries, which, strictly speaking, belong to the domain of surgery. Moreover, the references thereto can be found in Dr. Neale's work.

A few meagre accounts may be picked up here and there by wading through much literature. Out of a considerable number of the older works devoted to Materia Medica and Therapeutics, I can find but one casual allusion to its internal use. This refers to its employment in the treatment of intestinal worms. In "Medical Inquiries and Observations," written by Dr. Rush in 1789, this author states that he has often prescribed a teaspoonful of gunpowder in the morning on an empty stomach, and with obvious advantage in such cases. He believed the active medicament was the nitre, although from my point of view sulphur is the most likely ingredient to have this effect. In the form of sulphide of allyl (garlic), sulphuretted mineral waters, etc., or in its uncombined form, sulphur has been successfully exhibited for centuries as an anthelmintic.

About the latter part of the last century gunpowder was used in a small way as a disinfectant in the British navy. On board the war-ships it was a substance always to hand. Dr. Lind, in his work on the "Diseases of Seamen," published in 1774, advises that a small quantity of wetted gunpowder, secured in a proper vessel, should be burned two or three times a day in different parts of the ship, as a good means of preventing or mitigating infection. He observes, further, that "these steams and vapors, which are inoffensive to the lungs, besides correcting the bad quality of the air, produce another good effect, which is to make both the patients and nurses desirous of opening the doors and windows for the admission of fresh air."

Dr. Monro, shortly after Lind, wrote on the "Diseases of the Army." He advocated that the wards of military hospitals should be daily fumigated by means of aromatics, or wetted gunpowder thrown on burning coals put in an iron pot or chaffern, or from the steam of warm vinegar placed in the middle of the ward.

Apropos of this, it may be well to mention that gunpowder pastilles, medicated or not, with suitable aromatics, were used by our fathers and forefathers to fumigate their houses, and, indeed, are still burned by some, to a small extent, at the present time.

There can, I think, be no question that this explosive does possess considerable disinfectant properties. During the process of manufacture, or when ignited, this power is, doubtless, due to the sulphur acids or to the sulphide of potassium thereby evolved. Professor Faraday has stated that, when burnt in the air, the compound was wholly converted into gaseous matter; the white vapor being sulphuret of potassium. It may be well to mention also as a fact singularly confirmatory of its antiseptic nature, that in the powder-factories of Madras and elsewhere the workmen enjoy a complete immunity from cholera. Surgeon-Major Parker (*Lancet*, 1873), who cites the above fact, further states that, in the process of manufacturing gunpowder, the substance is exposed to a very high temperature, as high as 500°; he believes that it is possible that this immunity is due to the constant inhalation of evolved sulphurous acid gas.

The chief external use of gunpowder of which I know is in the treatment of ringworm (tinea tonsurans). For this troublesome parasitic complaint, when mixed with lemon-juice, it is one of our most efficacious remedies. The preparation is made by adding to the powder sufficient lemon-juice to make a moderately stiff, or semi-liquid, paste. This is to be applied twice or thrice daily to the part affected, preferably after the scalp has been shaved. In the course of an hour or so it dries or cakes on the part, and, at the proper time, is to be removed by the use of warm water and carbolic or tar soap. A fresh application must then be made. I have on several occasions been able to contrast the curative action of this with other applications, and particularly with the oleate of mercury (twenty per cent.). Careful trials have convinced me that the paste is a most efficacious remedy; that it contrasts favorably with other applications; and that a cure, in obstinate cases especially, can usually be effected in about six weeks, or at most two months. The essential point about any treatment for ringworm of the scalp, for it

to prove decisive, is that the application should be diligently and continuously applied until the new hair has become well established. Therefore much depends on the assiduity of the mother or nurse who undertakes to use the remedy prescribed.

There can be no doubt that the sulphur contained in the gunpowder-paste is the chief factor in destroying the fungus. Its admixture with charcoal, nitre, and lemon-juice in all probability greatly increases its efficacy as a parasiticide. Sulphur ointment has by no means the same efficacy. That sulphur does have a marked influence in this disease may be evidenced by the fact that Barlow (*Edinburgh Med. and Surg. Journ.*, 1805) obtained excellent results in cases of tinea capitis by means of a sulphide of potassium lotion, which he applied night and morning, and allowed to dry on the part, as well as by the remarkably rapid manner in which sulphurous acid, applied locally in the full strength, cures the same disease.

A SUBSTITUTE FOR SAND-BAGS IN TREATMENT OF FRACTURES OF THE FEMUR.

By Alexis Dupont Smith, M.D., Philadelphia, Pa.

THE difficulty in preventing eversion of the foot after fractures of the femur, either in the shaft or neck, is one which has called forth many more or less ingenious forms of apparatus. Probably the most frequent means employed are the sand-bags, which, while they sometimes meet the indications, often fail to keep the foot upright, and their inconvenience is more commonly the prominent feature in their use.

Having occasion to dress an intracapsular fracture of the neck of the femur this spring, and having on previous occasions been much annoyed by the failure of the sand-bags to accomplish what was desired of them, I devised the following simple apparatus, which is original with me as far as I know, and I may say that it has been employed in two cases and met the requirements fully.

A posterior splint, eighteen inches long, shaped somewhat like the leg, with hinged foot-piece held in place when in use by hooks is the basis. At the upper end of the splint two pieces of leather sufficiently large to embrace the leg are fastened, having eyelet holes and laces at their free borders. Two similar pieces are fastened to the foot-board to embrace the instep and base of the toes, leaving the ends open for inspection. On the under surface, just beyond the foot-board, is fixed a strip of wood twenty inches long and one and a half to two inches wide, one end held by a bolt on which it may revolve, the other free. When in use this arm extends externally at right angles to the direction of the leg, so that the foot cannot possibly roll outward. A depression at the heel, and liberal padding with cotton throughout, prevents excoriation. The stirrup of the extension straps passes outside the foot-piece and is not interfered with.

In applying the splint, the adhesive strips

are adjusted with stirrup as usual, and a roller bandage neatly put on over them. The limb is then raised sufficiently to allow the foot-board to pass between the stirrup and the sole of the foot, and the leg and foot are secured to the padded splint by means of the leather bands. The arm-piece is adjusted at

right angles to the leg, and extension applied as soon as the adhesive strips are firmly attached. I am satisfied that by means of this dressing eversion can be entirely prevented, which is not the case with sand-bags, and with much more comfort to the patient and his attendants.

PULMONARY CONSUMPTION CONSIDERED AS A NEUROSIS.

BEING THE FIRST OF A SERIES OF EVENING LECTURES GIVEN BY THE FACULTY OF THE PHILADELPHIA POLYCLINIC IN THE COURSE OF 1888 AND 1889.

BY THOS. J. MAYS, M.D.*

LECTURE I.†

THAT pulmonary consumption is not due to one single cause is but too apparent to any one who takes a clear and an unbiassed view of its origin. The evidence already collected shows pointedly enough that occupation, want of exercise, insufficient food, inheritance, excesses of all kinds, sex, order of birth, dampness, and change of climate are powerful factors in the production of the disease; and in carefully watching the progress of consumption one cannot help but be impressed with the fact that in many patients, and perhaps in all, a disturbance of the nervous system, too, plays either a causative or a concomitant rôle in its history. It would be strange if the nervous system remained normal alongside of a disease whose ravages are so general, and it has seemed to me that the following observations might be of some service in helping to recognize the intimate relation which undoubtedly exists between the nervous system and pulmonary consumption.

In June, 1885, M., a female, aged 26, became my patient, with the following history: She was confined the previous December, and apparently made a good recovery, with the exception of a violent attack of pain in the region of the right ovary, and some fever, as she described it, about ten days after the baby was born. She remained well until the following January, when she became chilly occasionally, and began to have night-sweats. When I saw her she had lost some flesh, no hæmoptysis, poor appetite, irregular bowels, and a whitish expectoration, not at all profuse. Her menses reappeared one month before (May). She never had malaria, nor rheumatism, but she complained of an ill-defined and shooting pain throughout the body, which localized itself especially behind the right ear, right side of the neck, and right costal portion of the chest. She also perspired very profusely around the back part of the head.

Physical examination showed body somewhat emaciated; heart normal. Right lung: diminished respiratory motion throughout, and a slight impaired percussion resonance in apex, associated with a few mucous râles in same area. Left lung: want of proper expansion, otherwise normal. There is a family history of the disease. At the same time I also had her examined by an expert gynæcologist, who discovered nothing wrong in her generative organs. Under treatment her appetite, cough, and expectoration gradually improved, and the mucous râles had all disappeared by the middle of the following August; and, with the exception of several attacks of pain in the right ovarian region, which, during their greatest intensity, radiated upwards to the stomach and intestines, she apparently felt better. Her menses failed to appear after September, and from this time on her case developed the most uncommon nervous symptoms. Her temperature, which did not vary much from the normal hitherto, now began to rise. The ovarian pain became very much aggravated, and tenderness began to show itself along the whole spine. The pain in the right side of the head, neck, and chest, of which she complained at her first visit, also became worse. In November there was slight dulness in right apex, subcrepitation in same area, extending to third rib in front, and to angle of scapula behind. Evening temperature, 101°. The ovarian pain appeared now at more frequent intervals, and nothing but large doses of morphine would relieve it. In December her arm and lower limbs became so painfully stiff that she was only able to move them with the greatest difficulty. This spell lasted for four or five days, when it entirely disappeared. The pain in the ovarian region and that in the right chest often came on alternately. She frequently said that when she had pain in her right lung there was none in her abdomen, so *vice versa*. The application of a hot poultice to the chest would relieve the pain there, but would drive it below, and the reverse of this was also true. By applying one pole of a galvanic battery between

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* Professor of Diseases of the Chest in the Philadelphia Polyclinic.

† Delivered October 30, 1888.

the shoulders and the other on the sternum, the pain would at once disappear in the chest, but would reappear in the pelvic region; but the application of both poles along the spine —the one in the neck and the other over the sacrum—removed the pain altogether. In fact, the galvanic current was the only means which afforded her any relief, and this was decided and instantaneous. After the manifestation of these nervous symptoms she became rapidly worse, and died in a short time. At no time was there any œdema or paralysis of the extremities in her case; and at no time, except when she was so stiff, did she suffer from any well-marked pain in these portions of her body.

The question which presents itself here for discussion is as to the precise nature of the relationship between the nervous and the lung affections: was one dependent on the other, or not? and if so, which was primary and which was secondary? or were both morbid conditions but manifestations of a still deeper-lying disorder? This is, of course, very difficult to determine, but it is very certain that, so far as time was concerned in this case, the nervous symptoms antedated those of the lung, and that the former aggravated the latter. The special interesting features of the case were the confinement of the disease to one side of the body until up to within a short time of her death, and the close sympathy which existed between the pain in the right ovary and that in the right side of the chest. It seemed as if the pain in the right side of the head, neck, and chest was reflex in character, and depended on the ovarian disturbance as its primary source of irritation, and that in time a reciprocal channel of communication was established between the two through which they reacted one on the other.

The literature on the subject of the relationship between phthisis pulmonalis and the nervous system is, so far as my knowledge extends, very scant. Most writers on phthisis, and on diseases of the nervous system, ignore it entirely, while many of those who do recognize it strangely regard the two conditions as being antagonistic to each other. As early as the year 1850 Dr. J. C. Holland defined pulmonary consumption as "a disordered condition of the nervous system." (See "On the Nature and Cure of Consumption," cited from Ancell's "Treatise on Tuberculosis," p. 556.) Dr. Copland looked upon tuberculosis and scrofula as depending on abnormal conditions of the nervous system; that the accompanying disturbances of digestion, of assimilation, of the circulation, and even the local determination of these diseases, he refers to the state of the nervous influence of these parts. (See "Dict. Practice of Medicine," part xv. p. 750, March, 1852; abstracted from Ancell's "Treatise on Tuberculosis," p. 564.) Walshe ("Diseases of the Lungs," 4th edition, p. 455) states that "hysteria is, on the whole, repulsive of phthisis as a coexistence,—that is, if a woman with hysteria becomes genuinely phthisical, the nervous affection falls into abeyance;" and again, on p. 479, in qualification of the above he says that "an hysterical woman may have frequent, shallow respiration, impaired percussion-tone, cough, expectoration, peculiar watery hæmoptysis, and night perspirations; she may lose flesh, and this even especially about the chest, and yet be non-phthisical. The existence of well-marked hysterical conditions of the spine, intercostal nerves, and skin, coupled with the peculiar watery hæmoptysis and the inordinate frequency of breathing, are valuable guides to the diagnosis. . . . And, again, though hysteria and phthisis be, in the main, antagonistic diseases, the antagonism is assuredly not absolute, and faith too confident in its reality has more than once led to serious error. It has every now and then happened that an hysterical woman, whose alleged chest-ailments were treated as pure figments, has died of genuine phthisis, while supposed to be simulating the disease."

Pidoux says that "neuroses, hysteria, melancholia, the proteiform neuropathic state known as 'neurosism,' often act as moderating agents. Phthisis in neurotic subjects has a very slow development, and periods of long intermission. I have no doubt that such subjects, among whom the disease is not rare, offer to it an extraordinary and almost indefinite resistance; and in treating them we must not pay too much attention to their abnormal nerves. . . . If a pulmonary consumption is combined with a neurosis, the organic lesion will evolve very gradually; gastralgias and enteralgias have often this effect. I look upon this statement as an axiom" ("Études sur la Phthisie," p. 151). And Largaud says, "We shall show how consumptives, even when most threatened, may live, thanks to hysteria; . . . the neurosis appears to play the part of a protector, as if in its presence the pulmonary complaint had its symptoms mitigated and its progress arrested. . . . Hysteria in a consumptive is not a symptom of tuberculosis; it is not a complication; it is only a new mor-

bid state without casual relation with it" ("Thesis," Montpelier, 1882).

In a very interesting and in some respects a remarkable series of papers on "The Relation of Hysteria with the Scrofulous and the Tubercular Diathesis," by Professor J. Grasset, M.D., published in *Brain*, vol. vi. p. 433, and vol. vii. pp. 13 and 161, and to which my attention has been drawn by Dr. Mills, the author advances the following views in explanation of the bearing between phthisis and hysteria: "Hysteria is the manifestation of the tubercular diathesis just as much as chorea is a manifestation of the rheumatic, and angina pectoris that of the gouty diathesis." By this he does not mean that hysterical subjects suffer from tubercles, but that the scrofulous and tubercular diatheses are constitutional states found in a series of generations of the same family, and among a certain number they are represented as neuroses. Thus, for instance, in a phthisical family you will see, of the children, one dying from tubercular meningitis, another become an ordinary consumptive, and the third escape the diathesis; or the last may be neurotic, hysterical, or a lunatic even. But, according to Professor Grasset, the last has escaped the hereditary diathesis in appearance only. He is tubercular, like the rest, though he has no tubercles anywhere. It is his neurosis which represents the diathesic affection.

He adduces forty-four cases, which he divides into two groups. First group: Hysteria, with tubercular heredity without pulmonary manifestations. Second group: Hysteria of a tubercular nature, with pulmonary manifestations; reciprocal influence of the two orders of localization.

On account of the intrinsic interest of the subject, as well as of the cases here recorded, I take the liberty of quoting some of the most representative ones of each group.

FIRST GROUP.

"CASE I.—*Neuropathic and Diathesic Heredity.*—Hystero-epilepsy, beginning at three years of age, with scrofulo-herpetic manifestations. J. C., 3 years old.

"*Neuropathic Heredity.*—Sister died at eight or nine months from meningitis, with violent convulsive attacks; brother died from cerebral accidents during a laborious dentition at thirteen to fourteen months. Maternal grandmother had severe attacks (epileptic?), and died insane. Mother very nervous. Maternal aunt has had violent attacks after strong emotion (fear of drowning).

"*Diathesic Heredity.*—Maternal grandfather had cancroid of the upper lip. Mother very lymphatic; ganglionic enlargements, with attacks of eczema behind the ear. Maternal uncle: marked scrofulo-herpetic eruptions. The sisters and brothers of the mother are all scrofulous, lymphatic, or of slow intellect. They are all below the average mentally, but those whose constitution is the best are the least developed in intelligence. Father lymphatic. Paternal grandmother rheumatic.

"*History of Patient.*—Has had lymphatic enlargements of the neck sometimes. An emotional shock, brought on by falling into a tub, was followed by an eczematous eruption. Three months after was seized with a vertigo, which attack repeated itself for a few weeks every two or three days. Two months after the beginning of these attacks of vertigo they were succeeded by loss of consciousness, retraction of thumbs, and convulsion of eyeballs. The attacks became more frequent. No convulsions."

"CASE II.—*Scrofulous Diathesis; Hysteria of a Sudoral Nature chiefly.*—On October 13, 1882, a girl of 14 was brought to me, who has menstruated since the age of eleven and a half years, and who for the last three days presented extraordinary local sweatings. All the external clothing is soaked around the waist. She saturated twelve napkins in a day, and wears the third flannel of the day. Suddenly she feels a very violent pain, which constricts the lower part of the thorax, and immediately afterwards she feels herself inundated by an enormous flux of perspiration at the stomach, the liquid flowing to the ground. These sudoral attacks began three days ago after a violent beating given by her aunt.

"Her father died from abdominal cancer and the mother from consumption.

"She had during childhood disorders of the ears, protracted suppurations, chilblains, impetigo of the scalp, ganglionic enlargements, etc. No thoracic symptoms, except a very slight dulness towards one of the external clavicular regions."

"CASE IV.—Mrs. G., aged 38. Mother and brother died from consumption. She had first hysterical fits at the age of twenty, which were grave, sometimes cataleptic, and occurred repeatedly. Violent pain in the spine and thorax. The rachinalgia is so great that she is unable to tolerate any pressure on the spinous apophyses. Nothing in the chest except some roughness at the apices."

"CASE XVIII. — *Tubercular Heredity; marked Hysteria.*

"*Heredity.*—Marie H., female; whose father became alcoholic after the death of her mother. Drunkenness very prevalent among the paternal ancestors. Her mother died of consumption at the age of thirty-six, and was free from nervous disease. The grandmother and two maternal aunts also succumbed to pulmonary phthisis. Patient has two sisters; one died ten days old, the other, aged twenty-nine, is alive, but in weak health, very nervous, and liable to frequent outbursts of anger, complaining of continual cardialgia and of leucorrhœa, which may be referred to a chlorotic and nervous state. She has two children, one a feeble-looking boy and an idiot girl. Her husband is alcoholic.

"*Previous History.*—She had measles at the age of five, which was followed by symptoms of scrofula. Menstruation began when eighteen years old; periods irregular, with lumbar and abdominal pains, nausea, and vomiting.

"*Present History.*—At the age of twenty-one or twenty-two had a nervous attack after some provocation, which was followed by chorea, incessant vomiting, with gastralgia, followed still later by true outbursts of mania."

SECOND GROUP.

"CASE XXVI.—*Tubercular and Neuropathic Heredity; Hysteria, then Pulmonary Tuberculosis; Disappearance of the Hysterical coinciding with the Appearance of the Pulmonary Phenomena; Death and Autopsy.*

"L., florist, female, 18 years of age. Her father, who died of pleurisy when forty-two years old, was very nervous and a drunkard. Paternal grandfather neurotic; mother subject to bronchitis. Maternal grandfather died in an apoplectic fit, aged sixty; maternal grandmother died from phthisis, aged forty-six; had twenty-one children.

"During childhood patient was scrofulous and had bronchitis. In July, 1871, she was attacked with hysteria, from which time on fits occurred with all their typical characteristics,—aura, hemianæsthesia, ovarian hyperæsthesia, etc. She was always chlorotic, and in January, 1876, she began to lose strength, and had vomiting and diarrhœa. In the following May there occurred an aggravation of these symptoms, with rapid loss of flesh and signs of pulmonary phthisis, which carried her off on the 21st of July.

"No hysterical attacks occurred in 1876. In the beginning of May of that year she had, however, well-marked hemianæsthesia and ovarian hyperæsthesia on the right side. On June 1 hyperæsthesia less intense; pinching, pricking, cold, etc., perceived, but less acutely than on the left. Sight, smell, and taste pretty equal on both sides; hearing less distinct on the right. On July 13 spontaneous hyperæsthesia has disappeared; ovarian pressure still produced pain, but no longer gave rise to the sense of strangulation. General and special sensibility almost equal on both sides.

"*Autopsy.*—Nervous system normal; supernumerary pseudo-ovaries on the right; adhesions at the apices of both lungs. Left lung: cavities in the upper third, granulations disseminated throughout the remainder. Right lung: several small cavities in the upper lobe; numerous tubercular masses elsewhere.

"An interesting feature of this case is the influence of tuberculosis upon the permanent symptoms of hysteria, hemianæsthesia, and ovarian hyperæsthesia, the latter symptoms disappearing synchronously with the progress of the pulmonary lesions."

"CASE XXVII.—*Tubercular Heredity probable; Partial Epilepsy, Hysteria, Concomitant Pulmonary Phthisis, retrograding while the Neurosis persists.*

"B., female, born in 1839, and admitted April, 1862. Father was a drunkard and died dropsical. Mother had hæmoptysis and died of bronchitis. Father and mother second cousins. Six brothers and sisters, all dead except one brother. She had several attacks of bronchitis during childhood. First fit at thirteen; in 1860 had painful hemiplegia. Coughs since four and a half years; had slight hæmoptysis twelve months ago. Frequent pains between shoulders and under clavicles. Expectoration abundant and mucopurulent in character, and somewhat fetid since three or four months. Occasionally marked dyspnœa and fits of coughing, especially morning and night. Percussion is painful, and shows dulness on the right side, in subclavicular and suprascapular regions. Humid râles at both apices, especially on inspiration more marked on right side; sonorous ronchi elsewhere; nocturnal sweats. In 1871 the state of the limbs varied. Left leg rigid, which is the seat of occasional spontaneous trepidation, and this is accompanied with tonic contraction of arm and rotation of head to the left. This is the incomplete seizure. In the complete attack the phenomena are more accentuated, and combine with rhythmical clonus. Flexion of the foot determines incomplete attacks. The patient sometimes passes whole days in a state of ecstasy, with

occasional tremors of the limbs, but no general convulsion.

"In 1872 seizures occur in which loss of consciousness is not complete, the eyes closing upon the approach of the finger. On one occasion no fit, but a peculiar state of abstraction, and hallucinations of ear and eye. From 1872 to 1877 similar hysteriform fits took place. In 1878 a physical examination of the chest showed only a slight diminution of resonance in right apex, back and front, with a rough vesicular murmur, and she coughed but rarely."

"CASE XXVIII.—*Neuropathic and Diathesic Heredity; Hysteria; Stercoraceous Vomiting; Convulsions; Pulmonary Tuberculization; Alternations between the Nervous and Thoracic Phenomena.*

"*Heredity.*—Her father's death was caused by an accident Her mother is very nervous. One of her sisters died phthisical at eighteen. Another had two attacks of acute rheumatism.

"*History of Patient.*—She is twenty years of age; face yellowish, pale; characteristic aspect of chlorosis. Very nervous; laughs and cries without motives. Hysterical fit, with stercoraceous vomiting. Very evident crepitations at the apex of right lung. Later on convulsive epilepsy, with left ovaritis and hemianæsthesia.

"A fact worthy of notice is that when her attacks came back, the cough was less troublesome, and the state of the lungs seemed to improve; then, as the nervous accidents diminished in intensity, the state of the lungs grew worse again. In 1876 the two lungs were attacked, and in April, 1877, the patient died. She had no hysterical accidents during the last six months of her life."

"CASE XXIX.—*Neuropathic Heredity; Hysteria; Tuberculosis; Death from Marasmus; Tubercular Granulations in Apices of Lungs.*

"The mother, whose health was delicate, died in early life of a disease which may have been a nervous or a cancerous affection of the stomach. The father died when fifty-five years old, after two months of mental alienation with incipient paralysis of the lower limbs. His sister suffers from a nervous affection.

"Always impressionable and easily moved, he has from twenty-five to thirty-two years of age been exposed to much worry. When thirty-five years old he had convulsions, which left weakness and numbness in the left side of the body and permanent pain in the middle of the back. He is admitted to 'La Charité' when thirty-seven, in 1851.

"The thorax is about normal; resonance deficient under the right clavicle, and the vesicular sound is a little weak in that spot. From time to time there occur attacks of dyspnœa. No cough, no expectoration. When he exerts himself to cough, to swallow, or to move about freely, we hear during inspiration a kind of stridor, resembling that of the first stage of a fit of whooping-cough; suffocation seems imminent. At that time very frequent convulsive attacks, anæsthesia, etc.

"Gradually the nightly attacks became less frequent, but the patient got weaker and lost flesh notably. The difficulty experienced in the act of deglutition increased, the ingestion of food became more and more difficult. Gradually the respirations became embarrassed, the laryngeal sounds increased, and at the same time the weakness rendered the cough, the expectoration, and the breathing more and more difficult. The continual epigastric pains and the nightly attacks gave rise to a feverish condition. Anæsthesia and paralysis came back again more marked than before. The intellect remained unimpaired. Death occurred on the 4th of May, after being four months in the hospital.

"At the autopsy nothing was found in the nervous centres except a little adhesion of the arachnoid and the pia mater (thickened but transparent) to the brain.

"The lungs contained at the apices some miliary tubercular granulations."

"CASE XXXI.—*Pulmonary Tuberculosis; Hydrotherapy; Hysteria; Disappearance of Pulmonary Phenomena; Cure.*

"Miss X. had frequent hæmoptyses, obstinate cough, intercostal pains, decline, and dyspeptic troubles. Physical examination proved crepitation at both apices. All ordinary treatment failed to relieve her. The attending physician ordered cold lotions to the extremities against the recurrent hæmoptysis, which ceased after a few days. The general state of the patient remained bad, and the phthisis seemed to advance. Miss X. was submitted to a hydrotherapeutic course. After a shower-bath a formidable hysterical fit broke out. A true neuropathic state manifested itself, and lasted a whole year, during which the morbid pulmonary phenomena improved in a marked way. A new affection then appeared in the shape of a sciatica, which cut short the hysterical neurosis. The sciatica resisted every form of treatment for eight months, but ceased on the occurrence of a furuncular eruption, and the patient

after this showed nothing special with reference either to the lungs or nervous system."

"CASE XXXV.—*Pulmonary Phthisis and Hysteria; Alternating Predominance of the Two Orders of Symptoms; Tubercular Cachexia; Diarrhœa; Death.*

"Patient remained in the hospital of Carpentras for nervous attacks. Her age is 20, and during her youth she has been pale, puny, and presented sure signs of scrofula.

"During her one year's stay at the hospital she has presented alternations of obstinate cough and hysterical fits. There were either powerful attacks, with globus and convulsive movements, or mere adumbrations of fits. The whole course was very irregular. She left the hospital very much better, as far as the cough and the neurosis were concerned, but her general state was still very bad.

"Patient married some time after, and gave birth to a child, which only lived a few days.

"She was lost sight of up to the day when she was admitted into the hospital for an obstinate diarrhœa (January 3, 1880).

"She says that since her confinement she has had a few fits, which have diminished in number and in intensity from the time when the cough has come back stronger and the diarrhœa manifested itself.

"She is very much thinner, very pale, and her courses have stopped. Crepitation at both apices, especially on the right side, and prolonged expiration. At night, when the respite given her by the cough allows her to sleep a little, she is at once bathed in perspiration. She has as many as ten motions a day, especially in the morning, and the fæces present the appearance of clay, and are of the consistence of pap. They are almost odorless, and contain neither shreds of false membranes nor any traces of blood. As to the neurosis, its only manifestation is a certain mental alternative. She chatters incessantly, tells lies at every opportunity, and passes without reason from laughter into sobbing fits. No convulsive attacks.

"The hysteria remained hardly noticeable for three months, and would, perhaps, have been overlooked but for the previous history; but auscultation and expectoration give us daily fresh evidence of the progress of the phthisis, so much so that from day to day a fatal termination is apprehended. On April 10 we are called at midnight. The following is the state in which we find her: She is shaken by movements so inordinate that all the nurses can do is to keep her in bed. She is unable to speak, but she puts one of her hands to her throat, and seems to beg that the assistants would tear away something which grasps and chokes her. The eyes are haggard, respirations noisy and stertorous. Then begin clonic convulsions, which last for about a quarter of an hour, after which the patient, exhausted, falls to sleep till morning.

"There we have evidently a return of the hysteria with a regular attack. From that day she has nothing but fits, declining in intensity, and we notice with astonishment that all the phthisical symptoms are daily improving. On the 1st of September the lungs have nearly recovered their natural action, and the patient has regained a little stoutness and strength, although the diarrhœa persists (three to six motions in twenty-four hours), resisting all the treatment directed against it.

"In the month of March of the following year the patient leaves the hospital, still with her diarrhœa, and goes back to her occupation.

"We have since learned that the patient, again considerably weakened by the diarrhœa, has once more been admitted into the hospital during the first days of the succeeding January. Her hysterical attacks had completely ceased, and the diarrhœa had given place to a generalized œdema, to which she succumbed on the 1st of March, without other characteristic symptoms of tuberculosis. No autopsy."

"CASE XXXVI.—*Pulmonary Phthisis at the Beginning; Hysteria displacing the Thoracic Symptoms.*

"Marie X., age 27, admitted into the hospital of Carpentras the 3d of February, 1881. Cannot give any information concerning her heredity. Seems to have had syphilis when twenty-one years old, but no trace of it is found at the time of her admission, except a chronic laryngitis, with very harsh voice. Rheumatic pains (?) for the last two months. She has taken a violent cold, degenerating into an acute bronchitis, which assumes a tubercular character; first sanguineous expectoration, then veritable hæmoptysis; abundant nocturnal sweatings; noticeable weakening and loss of flesh. Auscultation reveals dry and very harsh crepitations at both apices and prolonged expiration. Percussion yields a great difference of resonance between the apices and the bases, especially on the right side. Fever.

"Patient was growing worse daily, when, about the middle of April, she was suddenly

taken with a violent hysterical fit. She became so weak that she had to be carried to bed. She then experienced an abnormal weight in the epigastric region, as if something were rising, clutching her at the throat and choking her. She became extremely agitated, screamed aloud, and fell as if she were lifeless. Convulsions supervened, consisting of pretty regular alternations of contraction and of flexion of the legs and arms, then movements of pelvis. After a few moments she was exhausted and fell asleep.

"The next day a second fit at the same time; then a third and a fourth one, all identical. Since that time the state of our patient has altogether changed. The pulmonary affection improved very rapidly, so that after a month every trace of phthisis seems to have disappeared.

"The hysteria goes on, but is of a benignant type, and the patient leaves the hospital in September, retaining nothing else of her neurosis than certain mental peculiarities."

"CASE XXXVII.—*Incipient Pulmonary Tuberculosis replaced by Hysteria.*

"Louise B., 17 years old, was admitted into the hospital of Carpentras on March 4, 1881, with all the symptoms of chloroanæmia. Douches and ferruginous preparations. After sixteen days of this treatment she is taken with violent cough and sanguineous expectoration; at the time of admission auscultation had revealed nothing. She coughs more and more, and crepitation is heard in the apex of right lung, as well as harshness of the respiratory sounds, and prolonged expiration on both sides. Hæmoptyses and nocturnal sweats. The patient, very much weakened, can no longer leave her bed. The diagnosis made is tubercular bronchitis.

"Things grew worse till the 1st of May, when she is suddenly taken, during the morning visit, with slight convulsions, followed by deep prostration. On the same day, at 3 and 10 P.M., she was taken with similar fits.

"During the next two weeks she had aphonia, slight convulsive fits every day, constriction of the throat, together with anæsthesic and hyperæsthetic symptoms, and during the same time there occurred a marked improvement in the respiratory system and in the general state. About the middle of June the hysterical condition improved in its turn, and on the 1st of July she seemed quite well, and asked permission to leave the hospital. On the 1st of September, when she was discharged, the symptoms of pulmonary phthisis had disappeared, and of the neurosis nothing remained but a great tendency to lying and chattering.

"She is seen again in March, 1882, when nothing was found in her lungs, but she then manifested fresh neurotic symptoms. Hysterical fits every other day, with globus, tonic and clonic convulsions, erotic in character, and with loss of consciousness. Compression of one ovary calms the fit almost instantly, while compression of the other increases its intensity, and draws loud screams from the patient."

"CASE XXXIX.—*Heredity Unknown; Hysteria; Beginning of Pulmonary Tuberculosis, which makes no Progress.* (The observation includes a space of eight years.)

"L., female, 29 years old, was admitted into the hospital Cochin the 29th of May, 1873. Patient had typhoid fever about 1870, and pneumonia in April, 1873. Persistent anuria after the application of blisters. In June had symptoms of pelvi-peritonitis. Her general state is disturbed, and the patient becomes whimsical, etc. The vague nervous troubles become very pronounced. Pains in abdomen; vomiting. In November she slept for three days.

"In January, 1874, left hemianæsthesia; anuria and vomitings; recurrence of pelvi-peritonitis. In June, paralysis of left leg. On the 16th of August, beginning of pleurisy on the left side, with effusion. In October, anæsthesia and paralysis, and becomes paraplegic. Sometimes, in the beginning of December, a few fits of coughing, followed by slight hæmoptysis, accompanied by thoracic pains. Anuria and paraplegia persist.

"*January* 1, 1875.—Patient has a tired look, is thin, some cough, and hæmoptysis; auscultation reveals a few dry crepitations in right apex. Voice harsh, almost toneless for more than three months. Vomiting and ischuria; paraplegia and anæsthesia continue. The hysterical state shows itself also by a marked mental peculiarity, by diffuse neuralgia, by feelings of suffocation, which, for some weeks past, have taken the characters of the usual globus; profound anæsthesia of the ocular and pharyngeal mucous membranes. Semi-cataleptic sleep in March. Later on pulmonary congestion of the left side, with fever. In April, long fits of sleep. Left the hospital in July, when she showed signs of pulmonary tuberculosis.

"The patient does fairly well for four years. On March 10, 1880, she is taken with pains in the throat and with aphonia, and the urinary

troubles reappear; vomits; bilateral ovaritis; right hemianæsthesia. April 28 the patient looked well, but always perspires very freely. She had a slight cough, but auscultation reveals nothing but a little respiratory harshness at the apices. On May 13 she leaves the hospital, suffering only from aphonia."

"CASE XL.—*Tubercular Heredity; Pulmonary Tuberculization; Hysteria beginning with exaggerated and obstinate Sweatings.*

"Locksmith, 25 years old, admitted for bronchitis; dulness in right apex; expiration prolonged and jerky, and crepitation. Very abundant sweating during the night (not on the hands). Usual treatment of tuberculosis and granules of atropine. After four days generalized sweatings have disappeared, but now the palmar surfaces of each hand begin to sweat. Hydrosis very abundant, constant, and increased by the slightest emotion. Failure of atropine internally; partially successful when used subcutaneously. Duboisia more effective. The sweatings reappear, and resist other treatment. The mind becomes impressionable, irritable, and anxious. He is moved by nothings, cries easily, and presents various nervous phenomena, such as epigastric constriction, strangulation, and repeated hysterical attacks. Right hemiplegia and hemianæsthesia, with contractions, aphonia, etc. The general health during the intervals is perfect."

"CASE XLI.—*Hereditary Neuropathic Antecedents; Personal Scrofulous Antecedents; Pulmonary Tuberculosis; Convulsive Hysteria.*

"R., a soldier, admitted June 29, 1880, into the hospital St. Eloi. Brother died of convulsions; sister has curious nervous disturbances at each menstrual period.

"Patient is delicate and scrofulous; had measles, which left a hypersensitiveness of the respiratory mucous surface, which gives rise to bronchitis, and his expectorations are often bloody.

"Since he was ten years old he has had convulsive attacks of a hysteriform character, and on admission there is obtuse sensibility over whole body, with some painful vertebral spots. In the chest he shows signs of a tuberculous beginning in right apex, and a few dry crepitations, with harsh respiration and prolonged expiration in right supraspinous fossa. Stenosis of the pulmonic valve. The hysterical attacks continued. On the 15th of August the pulmonary lesions had made no appreciable progress, and he was dismissed on the 1st of September in a better state of health than when he entered it, without, however, being completely cured."

"CASE XLIII.—*Hystero-Epilepsy; Pulmonary Tuberculosis.*

"Marie F., 55 years old, admitted March 11, 1880. Nervous temperament; frequent headaches, which are preceded by vertigo; syphilitic. Subject to hystero-epileptic attacks, which have been observed to disappear by compressing the ovary. In her attacks she loses consciousness entirely, falls, foams, passes her urine, etc.

"On admission she complains of numbness in the right side, especially in the right hand. There is notable diminution of general and special sensibility on the right side. On the 22d of March there is found under the right clavicle very plain dry crepitations, and a slight dulness in same area. The following day she became subject to blood-spitting. She had, however, expectorated blood before.

"*March* 29.—Right ovarian pain under pressure; subdulness under the right clavicle; slight humid crepitations in upper third of that side; from time to time dry crepitations under the left side; behind and on the left, dry crepitations under the left side; behind on the right side, slight humid crepitations, less marked than in front; expectoration yellow and tinged with blood."

The histories of these cases, which have been collected by Professor Grasset from many sources besides his own, simply form an invaluable contribution to medicine, and I have taken the liberty of quoting some cases in full, and others in a condensed form, for the purpose of directing renewed attention to them. So far as my knowledge goes, it is the first systematic effort to show the intimate relation between hysteria and pulmonary phthisis. This much its facts establish beyond a doubt. From this it does not follow, however, that Dr. Grasset is correct in his primary assumptions when he states that hysteria and pulmonary phthisis are but the manifestations of a still deeper-lying diathesis, which he calls the tubercular; nor does it follow that these two diseases frequently alternate in intensity, or act antagonistically, because they are both believed to be rooted in this same diathesis. The erroneousness of these views, as well as that of the other, that hysteria is the only nervous state with which pulmonary consumption is associated, will, I think, become quite evident on closer examination of the factors involved in the problem.

From the facts already cited it must be admitted that hysteria and phthisis frequently occur and displace each other in the same in-

dividual. It is by no means certain, however, that these two diseases alternate in this manner because there is an inherent antagonism between them. Such a substitution is no more remarkable than many other similar phenomena which are constantly met in practical medicine. Do we not frequently see cases of pulmonary phthisis in which the cough and expectoration improve after the onset of diarrhœa, or in which the two former symptoms become aggravated when the latter ceases? Is it not also true that the gravest symptoms and physical signs of this disease will be moderated by the appearance of a delayed catamenial flow? or will be called into entire temporary abeyance by the pregnant state? To account for these interchanges on the score of an underlying diathesis would be in no greater harmony with the real state of affairs than it is to hold that hysteria and phthisis are the outcroppings of some still more fundamental disorder. The most consistent interpretation of these phenomena, so far as I can see, is, that they occur in accordance with the well-known empirical, though well-established, law, which implies that no two pathological processes occur with equal intensity in the body at the same time.

Indeed, it seems very probable that both hysteria and consumption are but a two-sided expression of a diseased state of the nervous system, and it will be seen that, after a frank and straightforward examination and construction of data, still further afforded by clinical and experimental medicine, the assumption that pulmonary consumption is a neurosis is more genuine than appears on the surface. And in carrying out my line of argument, in which I shall strive to show its truthfulness, I shall in the first place enter into a critical examination of the most common symptoms of the latter disease, and afterwards I shall discuss its relation to those nervous diseases with which it is often associated.

TOBACCO AND BACTERIA.

The popular belief in the germicidal virtues of tobacco-smoke (which we note has been revived in connection with the alleged immunity enjoyed by the cigar-makers of Florida during the recent yellow fever epidemic) has received some confirmation in the scientific researches of Dr. Vincenzo Tassinari, first assistant of the Hygienic Institute of Pisa University. In a preliminary note on his experiments (*Centralbl. f. Bakteriologie*, Bd. iv., No. 15) he describes the simple apparatus he designed to test the effect on pathogenic organisms of exposure to the fumes of tobacco. The apparatus consists in a chamber formed by two glass funnels placed horizontally, and connected together at their mouths by paraffin. In this chamber is suspended from a loop of platinum a small piece of linen, with the threads of its lower extremity immersed in a culture-fluid containing the microbes. The chamber is connected at one end by a tube with a cigar or cigarette, and at the other by a tube containing a plug of cotton-wool (to serve as a filter) with the mouth of the experimenter. The smoke as it is exhaled, therefore, thoroughly surrounds the linen soaked in the culture-fluid, and after the experiment, which lasts from thirty to thirty-five minutes, involving the consumption of from three and a half to four and a half grammes of tobacco, the chamber is opened and the linen allowed to fall into a test-tube containing fluid gelatin. Control experiments were also, of course, made. The micro-organisms subjected to this treatment included,—1. Spirillum choleræ asiaticæ. 2. Spirillum Finkler-Prior. 3. Bacillus anthracis. 4. Bacillus typho-abdominalis. 5. Bacillus pneumoniæ (Friedländer). 6. Staphylococcus pyogenes aureus. 7. Bacillus prodigiosus. The result varied with the variety of tobacco and the kind of microbe, but in every instance there was marked (sometimes very great) delay in the development of colonies in the gelatin as compared with that of organisms dealt with similarly, but without exposure to tobacco-smoke. Indeed, the development of some was entirely prevented. For example, in the third series of experiments cited, where large Virginia cigars were used, the development of bacillus prodigiosus was delayed for seventy-two hours, that of staphylococcus pyogenes aureus for seventy-three hours, of bacillus anthracis for ninety-seven hours; while of the others, mentioned above, no development of colonies took place after from a hundred and twenty-eight to a hundred and sixty-eight hours. Dr. Tassinari attributes these results to the chemical action of the ingredients of tobacco-smoke. He proposes to extend his researches more fully, both as regards the effect of different kinds of tobacco upon these and other micro-organisms, especially the tubercle-bacillus, and to determine the time of exposure as well as the amount of tobacco necessary to produce the full effect. He hopes also to ascertain what substance or substances are responsible for the germicidal action.—*Lancet*, October 13, 1888.

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EDITED BY
HORATIO C. WOOD, M.D.,
AND
ROBERT MEADE SMITH, M.D.,
PHILADELPHIA.

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Leading Articles.

ABSTRACTION OF BLOOD BY LIGATION.

FROM generation to generation for many centuries blood-letting was asserted by medical teachers to be of frequent necessity, and was demanded by the laity as the only hope of physical salvation in most diseases. Clerical orders, in their general rules and pulpit teachings, sustained the practice, affirming that through the shedding of blood vile desires were quenched and the body purged of sin. Even astrology had a voice upon the subject, directing that the operation should be performed under certain solar signs, when it would strengthen the body as well as the mind, and purify the senses as well as the stomach. We all know this, but we often forget the extent to which bleeding was practised and the eagerness with which it was demanded.

Somewhere in the 1840's a Rhenish physician was officially prosecuted because he had not bled a pneumonic patient nearly sixty years of age; while in this country so great a man as Samuel George Morton, in his work upon pulmonary consumption, published in this city in 1834, states that "it is a common practice with some physicians to bleed indiscriminately in all cases of hæmoptysis," and, while condemning this, affirms that "in persons of good health, in a first attack, the pulse being strong and the system feverish or excited, bleeding from the arm is indispensable, and the free and timely recourse to it may save the patient from the most hopeless consequences. Ten or twelve ounces of blood, taken rapidly from a large orifice, may divert the current of the circulation and relieve the pulmonary congestion. . . . If by this means the hemorrhage is not speedily relieved, let two or three cups be placed on each infraclavian region; but whether the cups be necessary or not, it is always desirable to establish a drain there, in the first place by a blister and subsequently by an issue, or tartar emetic plaster." He also claims that when "hectic is severe, with a full, hard pulse, especially at the onset of acute phthisis," bleeding is indispensable. That these directions were not only frequently carried out, but exceeded, is shown by the details of the case which he gives on page 129, relating how a young married lady whose lungs were tuberculous was largely bled three times in the course of a month, although during this period she passed through labor with its accompanying drain, and, as no relief had been afforded, was then blistered and freely cupped. It is no wonder that in those days the sect of medicine which practically let its patients alone rapidly grew into favor, and that in these latter times the regular profession has almost entirely abandoned the use of the lancet. In a practice during more than twenty-five years here in Philadelphia, including a constant attendance upon the largest hospitals, we have never seen a man bled from the arm more than four times.

It is true that the elaborate scientific study of Professor Jürgensen leads him to the conclusion that the domain of blood-letting in therapeutics is a very narrow one; but we are not at all sure that deeper research into physiological and pathological conditions may not in the future prove that we have too closely narrowed this domain, and that cases in which blood-letting or leeching is capable of doing good are far more frequent than we now believe. In intense pulmonic congestion connected with or dependent upon weakness of the right side of the heart, in conditions such as arise in excessively obese persons when the cardiac viscus is overwhelmed by the great mass of blood, in excessive pulmonary hemorrhage attended with high intra-

vascular pressure and lung congestion, in apoplexy or brain congestions occurring in the plethoric or attended by great arterial excitement, in these and other conditions not necessary here to mention, according to our opinion, bleeding is sometimes not practised when it ought to be. We recognize that the blood is real tissue, but it is a tissue which the body can easily repair, and the results which follow the free bleedings of civil and military accidents show that, after all, the loss of blood does not weaken the human organism to the extent that most of us conceive. Nevertheless, in many cases in which the doctor might desire to rapidly reduce the arterial pressure by withdrawing the blood, he is properly held back by the fear of the after-effects of such a procedure.

The idea of accomplishing the results of blood-letting by some way or other than that of taking blood is an old one, and it is the success of some of our attempts at doing this which has made blood-letting in some cases not as necessary as it was in the days of the fathers. Thus, in pneumonia with high arterial tension, when the dilated pulmonic capillaries invite the blood into the lung, by means of large doses of veratrum viride we can dilate the immense vascular territory of the abdomen, and thereby bleed the man, as it were, into his own belly. When, however, as in cases of pulmonic œdema or pulmonic congestion occurring in Bright's disease or in other conditions in which the heart is weak, there is danger of cardiac failure, it is not safe to use a depressant like veratrum viride under these circumstances. It was long ago suggested that in such a Junod's boot be applied to the legs, and more recently attention has been called to the fact that an elastic bandage can be applied to the extremities in such a way as to compress the veins and not interfere with the arterial circulation, and thus dam up the blood in the legs and arms. This suggestion has been acted upon by Dr. E. Haffter (*Wiener Medizinische Blätter*, September 13, 1888), who states that his sphygmographic studies prove that ligature of both legs reduces the blood-pressure one-half; and who also affirms that during two years of trial he has obtained more excellent results in hyperæmia of the lungs, overloading of the heart, and other similar conditions, by the use of the elastic band.

Dr. Haffter cautions against the application of this method in too intense or too weak a degree, and further lays stress on the necessity of a correct diagnosis. He employs black rubber tubing of about the thickness of a lead-pencil, applied around one extremity as near as possible to the trunk and tied tightly in a knot. The indications which call for this method of treatment are congestions of the lungs or other internal organs, pulmonary hemorrhage, and various heart-affections.

The suggestions of Dr. Haffter remind us of the practice of certain American surgeons, Corning, Aikins, Sweetnam, Post, and others (see *New York Medical Journal*, 1887), who, in order to save blood, or to aid in the securing of rapid anæsthesia, made applications to the extremities of tourniquets, or, preferably, of large rubber tubing drawn sufficiently tight to obstruct the venous circulation without interfering with the flow of blood in the arteries. The idea of saving blood in this way is said to have originated with Aikins, of Toronto, and to be of great value when the patient to be operated upon is so feeble that it is essential to prevent loss of blood. Moreover, if we may believe the statements of Corning and Sweetnam, much less of the anæsthetic is required when the ligatures are applied than when they are left off. Sweetnam affirms that if the wound be watched after the removal of the ligatures its color will appear to deepen, in five minutes, very distinctly from the increased blood-flowing to the part, and that hemorrhage, if it has previously stopped, will very probably recur,—indications that the ligatures are really effectual in shutting off a mass of blood from the general circulation.

SUCCINAMIDE OF MERCURY—A NEW PREPARATION FOR SUBCUTANEOUS USE.

ADVOCATES of the subcutaneous method of employment of mercurials have had continually to contend with the difficulty of obtaining a preparation of mercury, the inconveniences of whose subcutaneous use do not more than counterbalance the supposed advantages derived from its subcutaneous employment. The difficulty occasioned by the injections, the local inflammatory reaction, and the frequent occurrence of abscesses have, until now, proved insurmountable obstacles to the general adoption of the hypodermic method of the treatment of syphilis. Numerous preparations of mercury have been one after the other proposed for this method of employment, and one after the other have been abandoned to give place to something new. The last addition to this list of mercurial

preparations is the succinamide, which is enthusiastically recommended by Dr. Vollert in the *Therapeutische Monatshefte* for September, 1888. The succinamide of mercury is derived from anhydrous succinic acid, which, treated by dry ammonia gas, combines with the oxide of mercury to form a white, silky powder, which is highly soluble in water, giving an absolutely clear solution, which does not become turbid even on long standing, while it possesses the further advantage for hypodermic use of not precipitating albumen, even in the serous fluids of the body. The solution which Dr. Vollert first employed in the clinic at Strassburg was a one per cent. mercurial solution, 2 grammes (30 grains) of the succinamide being dissolved in 100 parts of water, 2 parts of the succinamide being equivalent to 1 part by weight of mercury. Before being used this fluid was filtered several times. The attempt was made to employ cocaine in combination with the mercury solution, so as to reduce the painfulness of its employment, but it was found that a precipitate was produced by its addition. It has been found, however, that no precipitate is produced if to each dose of the mercury only one-sixth grain of cocaine be added. Later a somewhat weaker solution was found to be preferable, only 1.3 parts of the mercury being dissolved in 100 parts of water. In comparing the results obtained by the use of the succinamide with the glycolate of mercury, a preparation which had been previously employed in Professor Wolff's clinic in Strassburg, the author assigns to the succinamide the following advantages: the solutions of the succinamide are more permanent, preserving their limpidness for weeks at a time, while the solutions of the glycolate have to be prepared at the time of their employment by the accurate measurement and mixture of three different substances. Further, the injections of the succinamide of mercury are much less painful than those of the glycolate, and produce much less marked and severe local infiltration, while, finally, the succinamide is a cheaper preparation. On the other hand, it would appear that the succinamide is not quite as active as the glycolate, and is about equivalent in activity to the cyanide of mercury without having the inconvenience possessed by the latter of frequently producing intestinal disturbances. Dr. Vollert tabulates the results obtained through the use of five hundred and twenty-three injections practised on twenty-eight syphilitic patients. In our opinion, however, a careful examination of his tables hardly seems to warrant the positive statement which he makes as to the slight painfulness which follows its use, and to the fact that it is generally well borne. In fact, it would almost seem that the opposite might be concluded. In nearly half of his cases serious complaint seems to have been made as to the pain which followed its employment, in some cases being so severe in character and the inflammatory reaction so intense,—abscesses or stomatitis being produced,—that it was necessary to resort to other methods of employment of mercury. The explanation which the author offers as to these mishaps is perhaps sufficient; he advises that the injection should be made deep into the connective tissue and not under the skin, and that the syringe should be carefully disinfected. In that way he says that the liability to inflammatory reaction will be reduced to a minimum; and that if, as he states, but one syringe was in employment for all those injections, and that in many cases they were administered by students, we can hardly be surprised that his results have not been more striking. He further states that from his own use of two hundred and ten injections he has in two cases only seen abscess follow its employment.

SULPHONAL.

SULPHONAL appears to retain the position claimed for it as an admirable and harmless hypnotic. One of the few cautions as to its use, by Dr. Schmey in the *Therapeutische Monatshefte* for July, 1888, in arterio-sclerosis seems to have been based on insufficient grounds, for we find that Dr. Müller in the August number of the same journal states that he has used it a number of times in cases of arterio-sclerosis, with so far from having unfavorable results, he has had most satisfactory success. He refers in detail to the case of a man 72 years of age, who for ten years had been confined to bed with a most depressing dyspnœa as the result of arterio-sclerosis. Digitalis produced transient relief of the dyspnœa, but the patient suffered from almost constant insomnia with, consequently, great reduction in strength. Morphine and chloral produced delirium with great excitement. Dr. Müller gave 15 grains of sulphonal at eight o'clock in the evening, and at eleven o'clock the patient was asleep and slept quietly the entire night, breathing being normal, and

remaining so through the following day. The second night sulphonal was not given and the sleep was disturbed; and the third evening 15 grains of sulphonal were again given, and again long, quiet sleep was produced, while the pulse, respiration, and appetite were greatly improved.

At the meeting of the Psychical Society of Berlin, held July 10, Dr. Otto-Dalldorf related his experiments as to the hypnotic action of sulphonal in various mental and nervous troubles, it being tested in sixteen cases; of these, eight were cases of senile dementia, four were paralytic women with insomnia and excitement, three had epilepsy with nervous sleeplessness, one paronoia with insomnia. Sulphonal was given in doses of 15 and sometimes 30 grains towards evening or at the close of the afternoon. The results were generally successful, sleep occurring usually about one hour after its administration, and lasting for seven and one-half hours,—while in restless patients even after waking from sleep the condition was much better than before. Unfavorable results were never obtained, and even in continued use of the drug for ten days increase of dose was not required. The author therefore confirms the favorable report of Rabbas, Salgo, Osterreicher, and others already alluded to in the GAZETTE. Dr. Otto-Dalldorf (*Deutsche Medicinische Wochenschrift*, August 23, 1888) further publishes observations as to the quieting effect of sulphonal in long-continued conditions of excitement in patients troubled with various mental affections. He has found that in many cases after a single hypnotic dose of sulphonal that, even after the sleep was over, the patient's condition was much calmer and quieter. His experiments in these conditions were made in twenty cases of women: two idiots with continued excitement; four cases of senile periodical mania; four extremely aged cases with great anxiety; four cases of paralysis with excitement; one case of melancholia with excitement; two of hysterical hallucination; three cases of epilepsy. In all cases the condition of excitement was of long duration, and was usually accompanied by insomnia. Sulphonal was given in small doses, 7½ grains, at various intervals during the day, the total amount given varying from forty-five to seventy-five grains in the twenty-four hours. As a rule, favorable results were noticed on the first or second day, occasionally sleep was produced even in the daytime, —and at night the sleep, even after the small doses, was as a rule profound and quiet. The favorable effect increased when the sulphonal was given several days in succession. Even when the number of doses was diminished, sleep was prolonged even after its administration ceased. Out of one hundred and twenty days during which sulphonal was given in the above-named cases, many of them highly excitable ones, ninety-five were noted as free from excitement, while the remainder were improved in condition. The most favorable action was seen in the senile cases and paralytics and the epileptics, then in the periodic and idiotic cases, and least in the cases of hysteria. No unfavorable results were observed, although in very few cases nausea, slight vomiting, and diarrhœa were produced, attributable perhaps to the use of the drug. Occasionally slight dizziness and depression were produced, occurring when forty-five grains were given daily. In these cases ataxia was not present and the knee phenomenon was preserved. Dr. Otto-Dalldorf advises that at first not more than forty-five grains in doses of 7½ grains at intervals of several hours be given daily, and when a quieting effect is produced to decrease the doses. The drug was given suspended in water, milk, honey, and in capsules.

CALOMEL AND DIGITALIS IN ASCITES FOLLOWING CIRRHOSIS OF THE LIVER.

THE diuretic action of calomel in dropsies, especially those dependent on heart and kidney affections, has been conclusively established. In cirrhosis of the liver, however, it has been but little used, and the opinions as to its usefulness in this affection are, therefore, not based on extensive experience. Thus, Rosenheim employed it without success, Leyden was somewhat better satisfied with it, while Meyjes has reported two cases in which apparently perfect cure resulted from its employment. Dr. Schwass (*Wiener Medizinische Blätter*, September 27, 1888) reports that for the last two years calomel has been employed in Professor Senator's clinic in the Augusta Hospital in Berlin in the treatment of ascites from cirrhosis of the liver with the most satisfactory results. It is well known that occasionally ascites from cirrhosis of the liver is cured spontaneously, and Monneres and Frerichs have reported such cases. In fact, Frerichs, from his experience, is opposed to the use of diuretics, as they are seldom of use. They disturb the stomach, and the case sometimes undergoes spontaneous cure, while

puncturing should only be performed, according to him, when the dyspnœa is so intense as to endanger life. Spontaneous cure, however, can be but seldom expected. Dr. Schwass reports several cases in which the use of calomel as a diuretic has been followed by the most wonderful results. Thus, he relates the case of a man, 45 years of age, who for ten months was a resident in the hospital, and was tapped twice every month for ascites and right-sided pleuritic effusion; as a result of energetic treatment with calomel the ascites entirely disappeared, and he so far recovered within a few weeks as to be able to leave the hospital and take a walking trip to the mountains. Transient success was also noted in a case of cirrhosis, with severe complication of organic heart-disease and nephritis, terminating in tubercular peritonitis.

Combinations of digitalis with calomel are especially efficacious, five out of ten cases being cured by their use. Results may be obtained by this combination which are not possible when either remedy is employed alone, while simultaneous use of the digitalis renders the calomel better supported, and permits of a longer treatment with it. It prevents salivation, stomatitis, and does away with the danger of gastric or intestinal catarrh. Of course, that ascites from cirrhosis of the liver be cured it is necessary for the patient to come under treatment in the earliest stages of the disease. In two cases, one complicated by extensive jaundice, diarrhœa and extensive hemorrhage in the other, the effect was negative. In fact, it would further appear that in most of the unsuccessful cases tubercular peritonitis was present, a complication which evidently more endangered life than the cirrhosis itself. The author recommends that in every case of ascites from cirrhosis of the liver, where there is no complication, with the exception of affection of the heart, or where the disease is not already in its last stages, that calomel and digitalis be tested, since in all probability life will be prolonged, and, perhaps, even cure obtained.

MEDICAL GRADUATES.

AS the readers of the THERAPEUTIC GAZETTE know, we have scrupulously avoided the discussion in its columns of any subjects not directly connected with the science or art of medicine. We have always been silent concerning medical ethics and medical politics. We feel, however, unable to refrain from a passing notice of the work of the Medical Examining Board of Virginia, because we believe that the only hope of the general elevation of the medical profession in this country is in the taking away of the power of licensing to practise medicine from the colleges and the giving of it to examining boards which are entirely distinct from teaching institutions. Since the organization of the Virginia board in January, 1888, two hundred and twelve graduates have appeared before it. Of these, forty-five, or 21.69 per cent., have been rejected, or, counting first and second applicants, two hundred and twenty-eight graduates, with a total of 23.69 per cent. From 1877 to 1887, inclusive, thirty-six thousand and ninety-seven graduates from medical colleges have entered practice in the United States. If these had all been efficiently examined according to the results just given eight thousand three hundred would have been rejected, or about one-fourth the number. Our own opinion is that this proportion of rejections is less than it ought to be. We have gone over the class-books of the Medical Department of the University of Pennsylvania, and find that one-third of those who entered that institution failed to get their degree. Practically all of these people graduate at one college or another, and our own belief is that at least twenty per cent. more go through the University examination than ought to. Can any one estimate the amount of damage that nearly nine thousand improperly-educated doctors can do in ten years?

Reports on Therapeutic Progress.

THE VALUE OF PILOCARPINE IN PREGNANCY, LABOR, AND THE LYING-IN STATE.

At the meeting of the Obstetrical Society of London, held October 3, 1888, DR. JOHN PHILLIPS read a paper with the above title, in which he treated the question at issue under five heads (*Lancet*, October 13, 1888),—1, the use of pilocarpine as an abortive; 2, for the induction of premature labor; 3, intra-partum; 4, post-partum and during the puerperium; and 5, in albuminuria, with or without eclampsia. Seven cases had been experimented on, and the results given in detail. Forty-eight cases under the second heading had been collected from all sources, of which twenty-seven had been arranged in

two tables, while two original cases had been appended in full. The author concluded that five only of these could be considered as unqualified successes, and thought that pilocarpine was able in a certain number of cases to induce labor, but that it was not in any way reliable as an ecbolic; those cases in which there was a tendency to premature termination of pregnancy were most suitable for its administration. Pilocarpine, intra-partum, was considered under three heads,—(*a*) the "latent period" of labor; (*b*) the dilating stage of labor; (*c*) the expulsive stage of labor. Five instances occurred in the author's practice, and in one sphygmographic tracings were taken at various intervals. The result of thirty-nine cases was worked out, twenty-eight being successes and eleven failures. The author concluded that during the dilating and expulsive stages of labor pilocarpine was equally productive of increase and intensification of labor-pains with ergot, but with more certainty of action and with none of its ill effects. Cases of simple uterine inertia were the most suitable for its administration. The drug was useless post-partum and to stay hemorrhage. In a third table the results of thirty-nine published cases of puerperal eclampsia had been given, with recovery of thirty-one mothers and eight maternal deaths, or 20.5 per cent. Although good effects were produced in twenty-eight cases, yet in nine such dangerous symptoms manifested themselves that the author was bound to warn others against its use, especially when coma was pronounced. He recommended bleeding in conjunction with pilocarpine where it will not act alone, and adduced evidence to show that the mortality is not greater under this mode of treatment than in any other. Statistics of treatment by other methods were given, and the results compared. The question of the reason why pilocarpine is productive of uterine pains was discussed, and three theories given; the "latent period" of the drug was referred to, and illustrated by cases. Further remarks were made upon the action of pilocarpine on the fœtus (with a fourth table), complications attendant on its use, the proper dose for administration, and contraindications. The paper terminated with conclusions as to its value and the precautions to be observed when used.

Dr. Champneys eulogized this monograph as a most valuable summary of our knowledge on the subject, calculated to render reference easy in the future. He confessed that it had not made him feel anxious to use the drug.

Dr. Herman observed that Dr. Phillips had stated in his exhaustive treatise that during the dilating and expulsive stages of labor, pilocarpine was equally productive of increase and intensification of labor-pains with ergot, but with more certainty of action and with none of its ill effects. Dr. Herman thought that there were few drugs so certain and so definite in their action as ergot. That drug produced its effects whenever it was administered, throughout the stages of labor, or when the uterus was delivering a fibroid. Provided that ergot was not given when contraindicated, no ill effects ensued. Whenever it was beneficial that uterine contraction and retraction should be produced, ergot would be given with confidence that this effect would follow, the causes of the few exceptions being pretty well known. The effect, on the other hand, of pilocarpine during the first and second stages of labor did not follow in every case, and, even when observed, was transitory. In the third stage, when certainty of action was especially wanted, its advocates admitted that it was valueless. The pains of the first and second stages of labor were influenced by so many causes that to determine the action of any agent upon the uterus it must be shown that its effect is both marked and constant. The entrance of the doctor into the lying-in chamber frequently stopped the pains for a time, but nobody contended that his movements had any special effect upon the uterus. Therefore the evidence failed to convince Dr. Herman that, in its effect on the uterus, pilocarpine was at all to be compared with ergot, either as to power or certainty. Assuming that the effect could be relied on, he thought that, remembering the sweating, giddiness, etc., which resulted from pilocarpine, there were fewer objections to the forceps. Dr. Herman concurred with Dr. Phillips in his warning against pilocarpine when eclampsia with coma had set in, on the ground of the dangerous liability to filling of the bronchial tubes with secretion. In eclamptic patients who recovered from convulsions and coma, the great danger was from pulmonary complications resulting from the great congestion of the lungs during the fits, and Dr. Herman thought that the liability to these lung-troubles would be increased by pilocarpine. Dr. Phillips's warning was hard to reconcile with his subsequent statement that the mortality was not greater under this mode

of treatment than under any other. If the dangers were real, they must raise the mortality. Dr. Herman thought that there was no satisfactory standard by which to estimate the mortality in puerperal eclampsia, since we did not know what was the average mortality when that complication was left untreated.

Dr. Dyce Brown was struck with the uncertainty of the action of pilocarpine as an ecbolic, according to Dr. Phillips's evidence. Not only was it useless for eclampsia, when not actually dangerous, but the dose which had produced dangerous symptoms in some cases was not higher than that which had been administered in other cases. Pilocarpine appeared to Dr. Brown to be a valueless addition to the obstetrician's armamentarium.

Dr. John Phillips remarked, in reply, that he had undertaken his researches with the greatest impartiality. Before commencing them, he had studied all the literature upon the subject, and had condensed the results in his tables. He had laid especial stress upon the danger of its use in puerperal eclampsia, a matter which had not received sufficient attention. Sänger's idea that its use might supersede the forceps was necessarily chimerical, and should not be entertained for a moment. He was sorry that all his evidence pointed to the fact that pilocarpine was not desirable as an ecbolic remedy, and that no positive evidence of its value could be adduced.

THE SURGICAL TREATMENT OF NASAL CATARRH.

At the meeting of the American Rhinological Association, held in Cincinnati on September 14, Dr. A. B. Thrasher read a paper with the above title (*Medical Record*, September 29, 1888). He said there are forms of nasal catarrh that can only be benefited, and not cured, by medicinal treatment. When we have mechanical obstructions to the lumen of the nares of a hypertrophic, hyperplastic, or neoplastic character, surgery offers the most direct path to the removal of the difficulty. These are the cases of nasal catarrh which have passed from one doctor to another, have used all the advertised remedies, so called, and have at last concluded that nasal catarrh is incurable, and it is of no use to treat it.

Since the cavity of the nose is open to inspection, directly and indirectly, it is rather curious that surgeons have been so slow to invade this region. They will cut with impunity into the abdominal cavity and remove or examine the contained viscera; or open the thorax and tie an artery or evacuate an abscess; or even cut into the brain-box to elevate a depressed bone or remove a tumor, and yet stand with folded hands and do nothing to check the symptoms caused by a neoplasm springing from the middle turbinate, or a hypertrophy at the pharyngeal vault. This is not so curious when physicians stop to think that the removal of a growth from the posterior middle turbinated body requires more manual dexterity and tactile skill than to open the abdomen, thorax, or even the cranium itself.

When a simple enlargement of the turbinated body is encountered, which it is desirable to reduce or remove, what is the best method of procedure? There are cases in which the application of a chemical caustic answers the purpose admirably well. The Woakes gouge or plough will do the work, and by the aid of cocaine will do it rapidly and painlessly.

In uncomplicated cases of chronic hypertrophic rhinitis the conditions to be met are: (*a*) obstructions to lumen of nares, and (*b*) abnormal condition of mucous glands. The causal indications would at once suggest a removal of the redundant tissue. The means employed should look to the accomplishment of this end with the least resulting scar surface, so that the natural condition of the epithelial covering might be as nearly as possible simulated. To reach this result he had met with the most marked success in the use of the galvano-cautery knife. He first anæsthetizes the part with cocaine, then introduces the knife to the posterior part of the hypertrophy, turns the sharp edge towards the tissue to be cut, heats the knife white-hot, and cuts deeply, drawing the knife forward. The result is a deep linear scar in an antero-posterior direction through the hypertrophic tissue. He cuts deeply enough to destroy a portion of the submucous erectile tissue. When this cut heals the result is a narrow linear scar, and by the natural contraction of the cicatricial tissue the surface becomes in time practically obliterated.

DISINFECTION AND DEODORIZING OF IODOFORM.

In the *Pharmaceutische Post* for September 30, 1888, Dr. R. Jaksch makes a statement which we feel confident will be a surprise to many of our readers, that iodoform as an an-

tiseptic and as a parasiticide is absolutely worthless, and he quotes a number of authors who have proved that iodoform scarcely interferes with the development of the various kinds of micro-organisms. The grounds, then, on which is based the wonderful success which has followed the employment of iodoform in the treatment of wounds seem to be thoroughly unknown, unless it may be that iodoform prevents the formation of ptomaïnes in the wound. To sterilize iodoform, Dr. Jaksch recommends its combination with an antiseptic, selecting one which would not be poisonous in the quantities which are usually employed as a local application to wounds. The author states that he has found that the antiseptics which themselves possess a specific odor, when combined with iodoform, not only reduce the odor of the latter but largely lose their own odor, and by combination of iodoform with carbolic acid, thymol, naphthalin, and creolin, iodoform is both sterilized and deodorized. Of all these substances, the author gives the preference to creolin on the following grounds: *First.*—It is the best antiseptic. *Second.*—It is entirely free from any poisonous action on the higher organisms: as much as seven hundred and fifty grains have been given internally to dogs and horses without the production of the slightest symptom of poisoning. *Third.*—Even in small amounts creolin thoroughly does away with the penetrating odor of iodoform.

Creolin-iodoform (one to two per cent.) well rubbed up is a brownish powder of slight aromatic odor. Soluble in alcohol and ether. When suspended in water the creolin is dissolved while the iodoform remains undissolved. Dr. Jaksch states that for a month or more he has been using creolin-iodoform in only two per cent. mixtures in the treatment of various wounds, ulcers, and abscesses, both in the form of a powder and as iodoform gauze, and he believes that his results are even better than would follow the use of the pure iodoform.

A NEW OPERATION FOR THE CURE OF VESICO-UTERINE FISTULA.

At the meeting of the Obstetrical Society of London, held October 3, 1888, Dr. Champneys, in a paper on a new operation for the treatment of vesico-uterine fistula, described a case where he performed the new method of operating (*Lancet*, October 13, 1888). The cervix being held down, the anterior vaginal wall was dissected away from the cervix to beyond the limits of the fistula. By this procedure a hole was left in the bladder and another in the cervix. These were closed and the vaginal wall repaired with complete success. The author compared this operation with those in use, and enumerated what he believed to be its advantages. In this case silver sutures were used; those closing the two holes were cut short; those uniting the vaginal wall to the cervix were afterwards removed. Dr. Champneys used silver sutures because he was anxious not to fail in a new operation on account of the sutures. In subsequent operations he would be inclined to try silk, so great was his belief that fistulæ would be easily and successfully closed by this method.

Dr. P. Boulton, with a large experience of injuries of the female bladder, had seen few cases of vesico-uterine fistula. In each, the anterior lip of the os uteri had been torn through at the time of the accident up to the seat of the fistula. Dr. Boulton thoroughly denuded the opening of the fistulous tract at its uterine end, closing this by means of a single "purse-string" suture, and at the same time repairing the torn cervix by means of an ordinary Emmet's operation. The top suture in the cervix made the fistula doubly secure. He had no dread of operating on uterine tissue. In Dr. Champneys's case the fistula was comparatively accessible, and might have been pared and stitched from the intra-uterine side, after widening of the os by Hagar's dilators, if necessary. Dr. Boulton saw certain objections to the new operation. 1. The pelvic cellular tissue was opened up, and freely bathed with urine during the whole of a long surgical proceeding. 2. The amount of necessary repair was more than trebled, since three large openings had to be closed. Dr. Champneys admitted that he used fifteen silver sutures. 3. All the sutures put into the bladder and uterus were shut up and left behind, seven in the bladder and four in the uterus. Though (as Dr. Champneys had noted) silver sutures were left in the uterus without evil results in Sänger's Cæsarean operation, there was no alternative in that case; while leaving or removing sutures was a matter of choice in repair of vesico-uterine fistulæ. Even now the patient might not be free from future complications, such as escape of a suture into the bladder and formation of calculus, or trouble during a future delivery.

Dr. Herman thought that the operation was a great improvement in the treatment of these cases, as far as could be judged from the de-

scription ; but very few persons had practical experience of vesico-uterine fistulæ. He would suggest that the objection raised by Dr. Boulton as to the undesirability of leaving so many silver sutures in the parts could be met by using catgut, which would certainly be absorbed. If this were done there would be no need for packing the vagina with gauze.

MR. ALBAN DORAN referred to Dr. Bozeman's recent bold innovations in the treatment of large urinary fistulæ. That authority recognized two obstacles to success in extensive plastic operations. The vaginal and vulvar tissues were kept in an unhealthy state, being constantly soaked in urine. The urine itself was in a morbid condition through pyelitis,—a complication constant, in his opinion, in old-standing fistulæ. Dr. Bozeman therefore fitted a drainage apparatus to the fistula, protecting the vagina, and after a time catheterized the corresponding ureter and washed out the kidney daily with sublimate lotion till the urine became healthy. Then he repaired the fistula. He had extended this operation to cases of primary pyelitis, making an artificial fistula, so as to reach the ureter.

DR. CHAMPNEYS, in reply, stated that in future he would use silk or perhaps chromic gut for sutures ; why he used silver in this case was already explained in his paper. With antiseptic irrigation, there was no reason to dread opening up the cellular tissue or the passage of a few drops of urine. He preferred to close a fistula at its origin, and, practically, throughout its course, to attempting its closure at the distal end only. Uterine tissue would of course heal, but it was not nice to work in. If Dr. Boulton had not performed vaginal extirpation of the uterus or supra-vaginal amputation of the cervix, he would be astonished at the ease with which the bladder could be approached by the way indicated in the paper, and Dr. Champneys verily believed that whoever once operated by the method described in his memoir would use no other operation in the future.

THE TREATMENT OF SYPHILIS.

According to the special correspondent of the *Medical Press*, October 3, 1888, at the Twenty-fourth Congress of Hungarian Naturalists and Physicians at Tatra-Füred, which was opened on the 23d instant, PROFESSOR EMERICH POOR read an interesting paper on the various methods of treating syphilitic affections. He discussed the question as to whether syphilitic diseases were more properly treated with mercury or with other remedies, and said that iodide was the safest and most harmless drug in the cure of syphilis. At the time when the lecturer became connected with the Rochus Hospital of Budapesth (in 1865) the most distinguished syphilographers, such as Ricord, Sigmund, Hebra, Balassa, Velpeau, etc., had defended the use of mercury with great enthusiasm, whereas other distinguished writers, such as Gautier, Rose, Thompson, Lister, Fricke, Bennet, Syme, Drysdale, Diday, Hermann, etc., had protested against it ; and neither Zeissl, of Vienna, nor Sauer, of Budapesth, were inclined to the use of mercury. The lecturer, who had had for several years an opportunity for observing the results of the treatment of syphilis with mercury in Budapesth at the clinics of Balassa, Sauer, and Krick, and at Vienna in the clinics of Sigmund and Hebra, had endeavored to find out how the so-called cured patients behaved after the internal and the external treatment with mercury. He had thus met with so many relapses of syphilis and mercurial poisonings that he most energetically protested against the use of the remedy under consideration. Professor Poor had particularly observed the following facts :

(*a*) That the patients, when treated with mercury, first presented the symptoms of mercurial ptyalism and gingivitis without being cured of the affection.

(*b*) That the mercury which had been administered in the first stage for preventing the secondary and tertiary symptoms of the disease only exceptionally served as a prophylactic.

(*c*) It was true that the use of mercury seemingly prevented the appearance of the secondary and tertiary symptoms of syphilis, but, on the other hand, the symptoms of the disease, or those of mercurial poisoning, and in most cases both these conditions, were observed after an interval of from two to three weeks in fifteen per cent. of the patients thus treated.

(*d*) With the administrations of mercury an indifferent but toxic substance was introduced into the organism, the excretion of which required a very long time.

Professor Poor, twenty-two years ago, determined on using in the case of syphilis iodide instead of mercury, as the iodide was rapidly removed from the organism and had no toxic influence. During the years 1866, 1867, and 1868 he had treated sixty-five patients after the methods of Sauer, Ricord, and

Sigmund,—viz., with protoiodide, mercury, and corrosive sublimate, or with the gray ointment; out of these patients thirty-nine individuals returned to the hospital again, being affected with syphilis or presenting symptoms of mercurial poisoning. Since 1866 his patients affected with syphilis had not been treated with mercury, either internally or with inunctions. The treatment of Professor Poor was the following: After the diagnosis of syphilis had been made the mineral aperient waters of Ofen were ordered as a preparatory treatment, and the patient was directed to take lukewarm baths. The iodide was used as a medicament under the form of a mineral water after the following prescription:

℞ Distilled water, from 300 to 1000 grammes;
Bicarbonate of sodium,
Sulphate of sodium,
Iodide of potassium, aa from 3 to 10 grms. M.
S.—From 1 to 2 large spoonfuls thrice a day.

This dose used to be augmented by one spoonful each week. When with a dose of 6 spoonfuls the symptoms of syphilis did not begin to disappear, the dose was augmented to from 7 to 8 spoonfuls, and only exceptionally it had to be augmented to from 9 to 10 spoonfuls to cause the syphilitic symptoms and the chronic infiltrations to completely disappear. From one to two soap-baths were ordered each week. The bubo indolens disappeared after the washings with the tincture of iodide.

By the procedure under consideration the lecturer had succeeded in removing the syphilitic symptoms of the first stage in an interval of from two to six weeks; in the second stage, of from five to ten weeks; and in the third stage, of from two to six weeks. The advantages of the treatment of syphilis with iodide were the following: 1. The treatment with iodide was never attended with ptyalism, affections of the gums, pharynx, etc. 2. Iodide intoxication never occurred when the above-mentioned diluted mineral water was resorted to. 3. In the treatment with iodide, the outbreak of the secondary symptoms had not to be waited for; on the contrary, the influence of the iodide was the more rapid the earlier it was used, and it was best to use it in the primary stage of syphilis; Professor Poor was even of the opinion that the first stage of syphilis until the tenth day of the outbreak could be rendered abortive by the use of iodide. 4. There was no relapse of the syphilis under this course of treatment.

INJECTIONS OF CORROSIVE SUBLIMATE IN HYDROCELE AND COLD ABSCESS.

Struck by the fact that corrosive sublimate readily leads to the production of adhesive inflammation, M. RICHET (*Journal de Médecine*, September, 1888) has been employing it in the same manner as tincture of iodine in the treatment of hydrocele, Van Swieten's solution being injected into the tunica vaginalis, but not enough to produce distention. The injection should be preferably first warmed to the temperature of the body, and then will be almost painless. After three or four minutes the fluid is allowed to escape, and the next day slight inflammatory reaction sets in, but much less marked in severity than follows the use of the tincture of iodine. On the third or fourth day the tunica vaginalis, and later the entire scrotum, will diminish in volume, and the patient will be cured with less suffering, both during and after the operation, than if he had been treated by the tincture of iodine. A similar method has also been employed in two cases of cold abscess, one in the ilio-crural and the other in the cervical region, with satisfactory results, although cure was but slowly attained.

THE OPERATIVE TREATMENT OF PULMONARY ABSCESS.

The success which has so far attended the treatment of abscess in the lungs by operation constitutes the latter a legitimate department of surgery. DR. QUINCKE, of Kiel, reports two cases thus successfully treated during the past year (*Berliner Klin. Wochenschr.*, No. 18, 1888). A year ago Dr. Quincke also reported two cases thus successfully treated by operation (*Berliner Klin. Wochenschr.*, No. 19, 1887). Taking this latter pair of cases first, in one a young man had a chronic abscess in the lower lobe of the left lung, apparently due to acute pneumonia two years previously. The abscess was opened, resection of the ribs being performed, and the man recovered in so far that he was able to work and felt quite well, but a permanent fistula remained. The inconvenience of this the man himself obviated by making a small tin receptacle, attached to his side, holding a little carbolic acid. When examined three years after the operation, the lungs expanded equally, and the chest was symmetrical, except for a slight depression over the site of the operation. There was no expectoration. The importance of securing adhesion of the pleural surfaces is shown by the next case, treated in

1877. Here the patient, a woman, aged 26, presented all the clinical signs of a large pulmonary abscess, including the expectoration of a large quantity of fetid pus. An attempt was made to set up an adhesive pleuritis by the injection of iodine into the pleural cavity. This caused pain, and a friction sound was soon heard; but the adhesions gave way soon after the abscess was opened, and purulent pleuritis caused death in three weeks, in spite of incision and injections. The author, with his present experience, would resect the ribs at the site most convenient, and reopen the abscess, in such a case. It is more difficult to induce firm adhesion of the pleuræ than in the case of the peritoneum, owing to greater disturbance during respiration; and the adhesions must be really firm, in Dr. Quincke's opinion, so as to withstand the elastic retraction of the lungs from the chest-wall. Complete success was obtained in the two cases treated last year. In the first of these, a man, aged 32, after symptoms of apparently an atypic pneumonia of a chronic character, suddenly expectorated a very large quantity of fetid pus, and the clinical signs left no doubt as to the existence of a pulmonary abscess, and not an empyema communicating with a bronchus. Radical measures were adopted; the eighth and ninth ribs were exposed on the right side, by the use of chloride of zinc, after preliminary incision. They were then resected for four or five centimetres, and next day chloride of zinc paste was again applied to the bottom of the wound. After a week, a capillary thread was introduced, allowing the escape of fetid pus, and the canal thus formed was gradually widened by the thermo-cautery till a proper drainage-tube could be passed and the pus evacuated. Within three weeks, expectoration ceased altogether, and the man, who had improved daily during this time, convalesced steadily. The right side did not expand quite as fully as the left four months after operation; but the patient had gained forty-six pounds in weight, and felt quite well.

The other case was not so typical, but is also instructive. A man, aged 23, had an acute illness, the symptoms of which pointed to either abscess of the lungs, or empyema communicating with a bronchus. But a friction sound persisted; exploratory puncture yielded no pus, and the muco-purulent sputa often held blood. Cavernous signs were absent at first. The illness was too acute for bronchiectasis. The operative treatment was the same as the foregoing, and, after six weeks, the patient was sent home cured. The left side (the side affected) expanded a little less than the right; the wound had quite healed, and there was no expectoration. In this case the first incision was made in the ninth intercostal space, and chloride of zinc paste was frequently applied for eighteen days before the ninth rib (now laid bare) was resected about an inch. The abscess was never opened in this case, for the insertion of a hollow needle twice yielded no pus, and the man improved steadily from the date of operation, so that further interference was deemed unnecessary. Dr. Quincke considers such an operation suitable also for bronchiectatic and tuberculous cavities. Such treatment in these cases has not met with much success hitherto, because the lung is usually in too diseased a condition around the cavity to effect its closure by elastic compression. The chloride of zinc applications, by setting up local inflammation, induce the same effect ultimately by cicatricial contraction, and therein lies the chief advantage of this mode of operating.—*British Medical Journal*, September 22, 1888.

MYRTUS CHEKEN.

The leaves of the *Myrtus Cheken*, which have been the subject of several partial investigations already reported in this journal, have recently been submitted to a thorough chemical investigation by Herr Weiss (*Archiv*, August, p. 665). Upon distillation the leaves yielded about one per cent. of a thin, pale greenish-yellow, dextrogyrous oil, sp. gr., at 15° C., .8795, miscible in all proportions with absolute alcohol, ether, and chloroform. About seventy-five per cent. of this oil consisted of terpene, apparently identical with pinene; the remainder of an oxygenated constituent identical with cineol ($C_{10}H_{18}O$) and a mixture passing over between 220° and 280° C., which was not nearer examined. The leaves, after the separation of the oil, yielded about fifteen per cent. of alcoholic extract, from which were separated (1) "chekenon," crystallizing in yellowish, odorless, and tasteless six-sided prisms, soluble in alcohol, ether, chloroform, benzol, and acetic acid, and insoluble in water, the composition of which is represented by the formula $C_{40}H_{44}O_8$; (2) "chekenin," crystallizing in odorless and tasteless, yellowish rhombic tables, freely soluble in hot alcohol and ether, and difficultly soluble in cold alcohol, acetic acid, benzol, petroleum ether, and water, represented by the formula $C_{12}H_{11}O_3$; (3) "chekenetin," obtained in yel-

lowish, almost olive-colored crystals, represented by the formula $C_{11}H_7O_6 + H_2O$, and probably allied to quercetin ; and (4) "cheken bitter," an amorphous substance, soluble in most solvents, to which the bitter taste of cheken-leaves is attributed.—*Pharmaceutical Journ. and Trans.*, September 29, 1888.

THE EMPLOYMENT OF BORIC ACID IN SOLUTION IN THE TREATMENT OF OTITIS MEDIA SUPPURATIVA.

At the meeting of the American Otological Society, held in Washington on September 18 last, DR. SAMUEL THEOBALD, of Baltimore, read a paper upon this subject (*New York Medical Journal*, October 6, 1888). In the ordinary cases of chronic suppurative otitis media, in which there was usually extensive destruction of the drum-head, he used boric acid in powder, applying it by means of insufflation ; but in acute cases and in chronic cases in which the destruction of the drum-head was not extensive, and in which a closure of the perforation might be anticipated, he preferred to use a saturated solution of boric acid. The advantages which he alleged for the solution in such cases were, that the healing of the perforation in the drum-head was more certain to be brought about when it was used than when the powder was employed, since the latter, by too suddenly drying the ear, and also by its mechanical action, frequently prevented the restoration of the drum-head ; that in acute cases it was safer, since it could not obstruct the free escape of discharge from the middle ear, as the powder sometimes did ; and that it could be applied more effectually than the powder could by unskilled hands. In his own practice no serious consequences had ever resulted from the application of boric acid powder to the ear ; but reference was made to the three fatal cases of suppurative inflammation of the middle ear reported by Dr. Gruening, in which the fatal result was attributed to the introduction—in two of the cases by packing, in the other by insufflation—of boric acid powder into the auditory canal. The strength of the solution which he commonly employed was fifteen grains to the ounce. If the discharge was profuse, the ear was syringed with this three times a day, and less frequently as the atorrhœa declined. In office practice it was more convenient, after having cleansed the ear by means of the syringe or cotton-holder and the Politzer bag, to instil the boric acid solution (saturated) with a pipette. Several cases were related which illustrated the good effects of this method of treatment, especially in acute suppurative otitis media.

THE THERAPEUTIC APPLICATION OF CREOLIN.

DR. J. NEUDÖRFER, of Vienna, contributes a paper to the *Med.-Chir. Centralbl.*, No. 28, 1888, on creolin (*London Medical Recorder*, August 20, 1888). He says that creolin manufacturers have a good reason for not divulging the secret of the chemical composition, in as far as it is a secret hidden from themselves. It is true that creolin does not contain a particle of carbolic acid, the test for which is extremely sensitive ; for a solution containing but one two-millionth part of carbolic acid, on being boiled with Millon's reagent (a solution of nitrate of mercury which contains nitrous acid), shows a yellow precipitate, which is dissolved in nitric acid, taking a deep red color. But though there is no carbolic acid in creolin, it would not be safe therefore to conclude that the latter is absolutely non-poisonous, since gas-tar yields many other poisonous substances besides carbolic acid,—*e.g.*, aniline, fuchsine, mauvin, safranine, etc. To throw light on this subject, Neudörfer has made experiments on animals. The first such was made on a curarized and tracheotomized dog, the venous pressure being gauged. The registering apparatus was fixed in the carotid, and the blood-pressure was found to be 55 millimetres Hg. Then about 1 gramme (15½ grains) of undiluted creolin was injected into the jugular vein, when the pressure at once sank to 44 millimetres Hg. The blood-pressure continued to sink slowly, and in six minutes was but 34 millimetres. Another gramme of creolin was then injected into the jugular vein, and the blood-pressure dropped rapidly to 22, and the dog died. In the next experiment the dog was neither curarized nor tracheotomized. This time the crural artery and vein were laid bare, the registering apparatus being fixed into the former. After the animal had become quiet the average blood-pressure for some minutes was 130 millimetres Hg. A gramme of creolin was then injected into the crural vein. This caused great pain, and brought on clonic spasms, which correspond with the great fluctuations of pressure registered by the apparatus. The pressure sank at once from 130 to 100, and then showed the following fluctuations : 180, 160, 140, 210,

130, 200. In fifteen minutes the spasms ceased, and the average pressure was again 130. On the injection of another gramme the blood-pressure jumped up to 190, and then fell at once to 196. The spasms caused fluctuations only between 110 and 130. In five minutes a third injection caused the pressure to sink suddenly, and the animal died. A few minutes after death the thorax and the abdominal cavity were opened. The inordinate fulness of the heart was striking. It was not the stopping of the heart in diastole, but a strong, active dilatation of the organ, that had so stretched the pericardium on one side that it was difficult to grasp it in a fold so as to make an incision. Similarly surcharged with blood and distended were the liver and the kidneys. The spleen presented an appearance quite in contrast with the other organs, being pale, thin, and bloodless, with its capsules wrinkled. For some minutes after death there were regular quivering movements in the muscles situated under the pleural covering. The following points are evident from these experiments:

(1) Intravenous injection of the drug has a poisonous effect.

(2) A dose of .5 gramme (7¾ grains) to every kilogramme (about two pounds) of body-weight, or of 1 cubic centimetre (16 minims) to every five hundred cubic centimetres of blood, causes death.

(3) From the violent general spasms, the restlessness and pain of the animal, the surcharging of the heart, liver, and kidneys with blood, and from the profuse salivation, it may be concluded that creolin intensely irritates the sensitive, motory, and sympathetic nerves, as well as, probably, the nerve-centres and ganglia. Neudörfer does not know of any conclusion to be drawn from the anæmic and wrinkled condition of the spleen.

But the danger of poisoning must not prevent the use of the drug, which, as an antiseptic, is preferable to carbolic acid, salicylic acid, iodoform, or sublimate. In a concentration of from 1 to 5 per mille, creolin may be applied to a wound without fear of poisoning, while it does not blunt the feeling of the operator's hands nor the edge of his instruments. It has no disagreeable smell, and there is no danger of poisoning from mistaking the drug. It possesses the following positive virtues: Purulence is dried up by its touch, and it leaves on the bandages merely some yellowish-green serum. It is, therefore, a drug that circumscribes and dries up purulence,—a matter of great moment to the surgeon. It further exercises a conserving effect on elements that have been formed, neither dissolving nor wrinkling them; it seems rather to render the intercellular fluid more viscous. To this property, as well as to its action on the vaso-constrictors, it owes its hæmostatic character. Much remains to be discovered concerning the details of its action, but generally speaking it may be termed an alterative medicine, because of its effect on the sensitive, motory, and sympathetic nerves, as well as, probably, the nerve-centres.

THE TREATMENT OF ULCERS OF THE CORNEA.

The "Treatment of Ulcers of the Cornea" was the title of a paper read by Dr. P. A. Callan, of New York, at the meeting of the American Ophthalmological Society in September last in Washington (*New York Medical Journal*, October 6, 1888). The ulcers occurred in young persons, and were often phlyctenulæ of the cornea, in which neglect and lid friction had caused absorption and an ulcer. A salve of the yellow oxide of mercury should be placed between the lids once daily; atropine and cocaine should be used, if necessary, also tonics and open-air exercise, regulated diet and airy sleeping quarters, smoked glasses, but no bandages or dark room. For ulcers due to conjunctivitis, that affection should be treated. In gonorrhœal ophthalmia, ophthalmia neonatorum, or granular conjunctivitis, we should redouble our efforts when the cornea is threatened; cutting the canthus, applying leeches or ice-compresses, etc. Referring especially to ulcers without apparent cause, due to some constitutional trouble,—malaria, syphilis, etc.,—the author said that the constitutional remedy should be employed, and, under cocaine, the ulcer cleansed with a piece of absorbent cotton wrapped on a holder. Then, with another piece of absorbent cotton, it should be swabbed with a 2-grain solution of nitrate of silver, leaving no part of the ulcer untouched. This might have to be repeated two or three times in as many days. The eye should be bathed with hot water (120° to 130° F.) half an hour, three times daily. If much corneal irritation existed, it should be bathed with a boric acid solution; then atropine and cocaine used, and the eye kept bandaged. The point was to get a clean wound, and this was obtained better and more safely by use of the nitrate of silver solution than by any other means known to him. Besides clearing the ulcer, it stimulated repair.

THE PHYSIOLOGICAL ACTION OF BORNEOL.

Borneo camphor, Ngai camphor, and borneol, prepared artificially from oil of turpentine, are known to chemists under the name of borneol, but, although they are identical in chemical composition and reactions, they differ considerably in outward appearance and in certain physical properties. These three substances, together with ordinary or laurel camphor, and with menthol or peppermint camphor, have formed the subject of an elaborate physiological research made by DR. RALPH STOCKMAN in the pharmacological laboratory of the University of Edinburgh (*Journal of Physiology*, vol. ix., Nos. 2 and 3).

Borneo (Sumatra, Malay, Baros) camphor is obtained in small quantity from the trunk of the *Dryobalanops camphora* (Colebrooke), a large forest-tree growing in Sumatra and Borneo. After the tree has been felled the camphor is picked out by hand. The finest quality is in large, flat, white crystals, and the inferior qualities in granules. It melts at 198° C. and boils at 212° C., subliming unchanged.

It is slightly heavier than water, therein differing from laurel camphor, and its alcoholic solution rotates the plane of polarized light to the right. It has the formula $C_{10}H_{18}O$, and is to be regarded as a monatomic alcohol, of which common camphor ($C_{20}H_{16}O$) is the aldehyde. By appropriate means laurel camphor may be converted into borneol, or *vice versa*.

Ngai camphor, obtained from the *Blumea balsamifera*, D. C., is met with crystalline and in granules. It has the same chemical composition as Borneo camphor, and is also slightly heavier than water, but its alcoholic solution rotates the plane of polarized light to the left. Borneol from oil of turpentine was first obtained by Armstrong and Tilden from "colophene," a product of the distillation of the oil with sulphuric acid. Chemically, it is identical with Borneo camphor, but its alcoholic solution has no action on polarized light. It occurs in laminar crystals, pure white, and having a mixed odor of camphor and terebene. It sinks in water, and its alcoholic action is inert as regards polarized light. It melts at 199° and boils at 211°, which numbers, allowing for slight experimental errors, are the same as those obtained by Pelouze for Borneo camphor.

Dr. Stockman's investigation was originally undertaken with the view of determining whether the exaggerated value set upon Borneo camphor by the Chinese is to be accounted for by any marked difference in action as compared with laurel camphor, or whether its high price is simply due to a superstitious belief in its supposed virtues, and to its comparative scarcity. While carrying on the research the author obtained specimens of Ngai camphor and artificial borneol, and found that all three produced similar symptoms when administered to animals.

In frogs, the general symptoms are very similar to those which are produced by laurel camphor. The drug may be given dissolved in almond oil or water, or as a fine vapor from camphor sublimed on the inner surface of a glass bell-jar. If a frog be placed under such a bell-jar there ensues a series of symptoms indicating paralysis of the nervous system. Their onset is much more gradual, however, than is the case with laurel camphor under similar circumstances, owing probably to borneol being much less volatile. In about ten to thirty minutes the animal becomes decidedly lethargic and sleepy looking, without any stage of previous stimulation. It is disinclined to make spontaneous movements, but jumps quite well if irritated. In a short time its jumps become heavier, and its movements lack precision, the animal frequently falling to one side when attempting to leap. The pupils are smaller and the respiration slower and deeper.

After a varying period respiration ceases, it lies quite flaccid, and does not return to its normal position when placed on its back.

During this time the spinal reflexes are quite good, or may be even slightly exaggerated, but they also become extinguished after a time, and the frog no longer gives any response, even to severe stimuli. No muscular twitchings were ever observed.

The motor nerves still remain excitable to feeble electric currents, but after exposure to the camphor vapor has gone on for some time longer their terminations become paralyzed, the muscles retaining their excitability to direct stimulation.

As a rule the heart continues beating for a considerable period after this, but finally stops in diastole, and the animal dies.

When a small dose, .003 to .001 gramme ($\frac{1}{20}$ to $\frac{1}{60}$ grain), is given subcutaneously dissolved in almond oil, the same train of symptoms is observed, but not so fully developed.

The frog in a few minutes becomes unsteady in its movements, and then ceases to move spontaneously at all. The reflexes are maintained, sometimes very slightly, some-

times considerably, diminished; respiration may be much slowed or may cease entirely; and the animal will probably remain on its back if placed there. The motor nerves are quite unaffected, or apparently so, and recovery takes place in a few hours.

With .0022 to .0032 gramme death generally ensues, but only after an interval of about twenty-four to fifty hours. The frog in a very short while after administration ceases to respond to stimuli and lies as if dead, but the heart continues to beat.

The condition of the motor nerves depends entirely on the heart. If it continues beating they lose their excitability generally towards the end of the first day, whereas, if the heart stops earlier, as it sometimes does, they still remain excitable to strong currents after death. Death is due to paralysis of the cardiac muscle.

Observations were made on rabbits, guinea-pigs, cats, and dogs. It is on cats that the symptoms produced by borneol may be observed in their most typical and aggravated form. As has been shown by Hoffmann and others, laurel camphor causes in cats violent convulsions which resemble in every respect those of epilepsy. With a moderately large dose, the convulsions succeed each other rapidly, with short intervals of rest, they are extremely violent, and death generally occurs during one of them, shortly after the administration of the camphor. Wiedemann ascribes the cause of death to paralysis of the over-stimulated nerve-centres, but points out that, owing to the very great violence of the convulsions, it is difficult to determine how far the respiratory centre is involved. With borneol the symptoms in cats are somewhat similar, but the convulsions are never so severe as to directly cause death, having throughout more of a clonic than a tonic character. In addition, death never occurs suddenly, but is a slow process, the animal surviving in a state of complete insensibility for two or three days. It is comparatively easy, therefore, to fix the proximate cause or causes of death.

Thus, after administration of 2 to 3 grammes by the stomach in emulsion, a cat shows in about a quarter of an hour symptoms closely resembling those of alcoholic intoxication. It wanders restlessly to and fro, its gait becomes unsteady, and in walking it seeks to support itself by leaning against the wall. Its power of co-ordination becomes much impaired, especially in the hind legs, and even when sitting still it sways gently from side to side. This condition rapidly becomes worse until progression is simply a series of stumbles, the animal finally lying down on its side unable to rise. The cutaneous vessels are dilated and respiration is slowed, but the heart maintains its previous rate or it may be slightly increased. The animal, although stupid and intoxicated, retains consciousness, while the spinal reflexes are either not appreciably affected or very slightly diminished.

There then begins slight trembling, most marked in the head and neck muscles, which soon develops into violent clonic convulsions involving all the muscles in the body. Every now and again, but by no means frequently, the clonic develops into a tonic spasm with opisthotonos. After it has once begun, the trembling is continuous, while sometimes in addition the animal moves its legs backwards and forwards in a rhythmical manner. During this stage the pupils are always widely dilated, and remain so till death. Chloroform completely stops the convulsions.

Consciousness gradually becomes abolished, and the animal lies on its side, trembling continuously, and having at intervals true epileptic convulsions.

Sensation also becomes impaired, until even stimulation of the exposed sciatic nerve causes no reflex movement. The ability of the spinal cord to conduct motor impulses is, however, quite well maintained, as evidenced by the violent convulsive movements. The animal may remain in this condition for about forty-eight hours, the heart continuing to beat regularly and with considerable force, although somewhat slowed, or it may die earlier.

The temperature falls very much towards the end, the surface of the body feels cold, and death ensues from paralysis of respiration, largely aided, no doubt, by loss of bodily heat and exhaustion. The post-mortem appearances are those of death by asphyxia, but in addition the tongue was in some cases very much bitten during the convulsions.

With smaller doses (1 to 1½ grammes) the symptoms are precisely similar to those produced by a moderate dose of alcohol. Frequently twitchings of groups of muscles or of the limbs are present, very similar to what is observed in delirium tremens. With very large doses (4 grammes) death occurs sooner, while paralysis and stupor are more pronounced features of the poisoning than the convulsions.

When menthol (2 to 3 grammes) is given to cats the symptoms resemble those produced by a full dose of alcohol,—restlessness, inco-ordination, and quickening of pulse, pass-

ing into stupor. The animal may remain completely unconscious for two or three days, finally recovering, or may die. Absorption from the stomach is evidently irregular, as the animal often remains under the influence of a single dose of menthol for several days, the degree of intoxication sometimes varying a good deal during this period. In contradistinction to borneol the increase in pulse-rate was always considerable (12 to 22 per minute) during the first few hours, and was followed by a very distinct decrease.

From the foregoing description and experiments it is obvious that, in frogs, the part chiefly acted on by camphor is the nervous system. If we carefully analyze the order in which the various symptoms supervene, we can deduce with considerable accuracy the order in which the different parts are affected. Thus, the primary lethargy and dulness show early implication of the cerebrum.

The loss of co-ordinating power, following shortly after, points to rapidly succeeding involvement of the optic lobes and cerebellum, while the next symptoms—inability to get off the back and cessation of respiration—prove that the paralysis has extended down to the medulla oblongata. Much later the spinal reflexes are abolished, and, lastly, the excitability of the motor nerves. Naturally, from the very commencement of the poisoning all parts of the nervous system begin to be affected, but some succumb much later than others, and the order in which they finally surrender to the influence of the camphor is as stated above.

In the mammalia the symptoms may be referred almost entirely to the encephalon, the cord being affected much less profoundly, while the motor nerves in every case retained their excitability to the end.

There are certain points to which the author draws special attention as regards the nervous system :

1. In frogs, it is evident that in some cases the reflex power of the spinal cord is not quite abolished before the motor nerves become paralyzed.

2. The continuation of well-marked spinal reflexes in the frog long after voluntary movements have ceased.

3. The reflex function of the spinal cord is paralyzed sooner than its power of conducting motor impulses.

4. As regards convulsions, the author's observations seem to prove that they are not due to stimulation of the medulla oblongata or cord, but are due to an action on the cortex, and are, therefore, truly epileptic in character.

On the heart of the frog laurel camphor decreases the rate of pulsations, with a marked increase in their energy. Similar results have been obtained with menthol, while borneol is claimed by Pellacani, even in comparatively small doses, to arrest the heart after a few moments. Dr. Stockman, however, states that the action of all these camphors is precisely similar to that of laurel camphor. Dr. Stockman shows that atropine does not affect the action of camphor on the frog's heart, which shows that the influence of the drug in slowing the heart is not exerted on the inhibitory apparatus of the heart, for borneol even paralyzes the vagus ; its action must, therefore, be attributed to influence exerted on the motor ganglia. On mammals no striking results on the circulation were observed by the author, the effect being entirely inconstant, except with large doses, when the blood-pressure rapidly falls. The respiration is always slowed from the first. The author has further found that sugar occurs in the urine in camphor-poisoning, when the convulsions have been a marked feature.

HYDROFLUORIC ACID IN PHTHISIS.

Dr. Gager, of Arco, near Gastein, has published in a Hungarian medical journal an account of seventeen cases of phthisis in which he employed the hydrofluoric acid treatment. From the results obtained he is led to think that this treatment is in some cases capable of exerting a really beneficial influence. His method of procedure differs somewhat from that employed by Dujardin-Beaumetz, Hérard, Garcin, Lépine, and other French physicians who have written on the subject. As an inhalation-chamber, he made use of a compartment of a wooden hut, which was well boarded, and had a well-fitting window-sash and door. Its capacity equalled eight cubic metres. In this the patients—one, two, or three at a time—were seated, their clothes being protected from the injurious effects of the acid by sheets. The gas was manufactured in an adjoining compartment, and conveyed to the ceiling of the inhalation-chamber by a leaden pipe. For the preparation of the gas, Dr. Gager at first employed Seiler's apparatus, but subsequently discarded it for one he devised himself out of a pair of bellows, a gas-meter, a three-

necked gutta-percha bottle of the capacity of a litre, with some india-rubber and leaden tubing. This apparatus (which is now obtainable from Herr Siebert of Vienna) answered so well that he has employed it constantly. A solution of hydrofluoric acid was used of the strength of forty-six to fifty-four per cent.,—*i.e.*, of from 28° to 32° of Baumé's hydrometer. Sometimes this solution contained minute quantities of sulphuric acid or of sulphuretted hydrogen, but no evil effects were produced by these impurities. They came off almost entirely in the first five or ten minutes, so that if after that time the inhalation-chamber was well aired the gaseous contents were subsequently pretty pure. As the inhalation-chamber was closed, the air soon became vitiated by the patient's breath. It was, therefore, always necessary to open the door and window for two or three minutes, so as to ventilate the apartment from three to eight times during the hour the inhalation was continued. As a rule, the patients were ordered one sitting of an hour's duration daily; occasionally, however, two sittings were given. The volume of air impregnated with hydrofluoric acid driven into the chamber was, during the earlier sittings, from eighty to one hundred litres per head during the hour. After the first five sittings, when the patients had become a little habituated to the gas, the amount was increased to from one hundred to six hundred litres per head. Into the gutta-percha bottle was poured one hundred grammes of distilled water, and to this thirty grammes of the solution of hydrofluoric acid of the strength of 30° to 32° Baumé added. The bottle was not emptied after the sitting, but before the next time it was required a fresh portion of thirty grammes of the acid solution was added, and this was repeated until the amount of fluid in the bottle reached to nearly three hundred grammes. It was then emptied, and one hundred grammes of distilled water put in again, the acid being added as before. The external temperature appeared to influence the quantity of gas taken up by the air, as it was forced through the solution considerably. On warm days the patients always remarked that the "inhalation was stronger." On these occasions a little pure air was also pumped into the inhalation-chamber. All the patients on whom this treatment was tried presented tubercle-bacilli in their sputum, the author's investigation being specially directed towards the "antibacillary" property of the hydrofluoric acid. Care was also taken to examine the state of the kidneys and the urine, so as to exclude all cases with renal complications. All the patients complained during the first three sittings of smarting and itching in the nose, of smarting in the eyes, and often of sneezing, which lasted for days. Some patients had increased cough, and even streaks of blood in their sputum,—the inhalations having, indeed, to be stopped for some days on that account. Thirteen of the seventeen patients found their appetite increased after the inhalations. In one case there was a slight epistaxis. The following is a *résumé* of the general results obtained: (*a*) In five cases the bacilli disappeared from the sputum, a marked improvement of the symptoms being also noted. (*b*) In seven cases there was a distinct improvement in the physical signs. (*c*) The body-weight increased in twelve patients, but the amount of increase appeared to bear but little relation to the improvement of the general physical condition; *e.g.*, in one case where the bacilli disappeared, and where the physical signs improved, there was no increase in the weight at all, and in another there was no improvement, though the weight increased nearly four pounds. (*d*) Three of the patients had pyrexia; of these, one lost it entirely, together with all the expectoration and bacilli; in the second case the fever decreased, but in the third it continued as high as ever. (*e*) One of the patients suffered from night-sweats; these entirely disappeared. (*f*) In seven cases the vital capacity increased to the extent of from one hundred to six hundred cubic centimetres. (*g*) In two cases somewhat severe irritation of the laryngeal mucous membrane was set up, thus showing that this kind of treatment is contraindicated in cases of laryngeal phthisis,—at all events, only an exceedingly small quantity of the gas ought to be given. (*h*) In five cases, including one where laryngeal complications existed, no improvement could be noticed; one very advanced case died. (*i*) No evil after-consequences presented themselves in any of the cases.—*Lancet*, September 22, 1888.

ABSORBING POWER OF THE NORMAL URETHRA.

Dr. Phélip has been publishing in the *Lyon Médical* during the month of September an elaborate experimental paper on the "Absorbing Power of the Normal Urethra." He has found that the normal urethra of the dog possesses the power of absorbing sulphate of atropine in solution, but that this absorption

is much less active than generally supposed, and is not to be compared with the absorbing power of cellular tissue, and is but little more marked than that of the normal vesical mucous membrane if both parts are placed in the same condition. In order to obtain equivalent results, the author has found that it is necessary to inject subcutaneously one-fortieth the amount injected into the urethra, while three or four times the amount injected into the urethra must be introduced into the bladder after it has been emptied to produce similar results. The absorbing power of the bladder is more marked when that organ is distended than when emptied. In the former condition it is about one-half as active as the urethral mucous membrane in the dog. Urethral absorption occurs principally in the deeper parts of the urethra.

LAPAROTOMY FOR CHYLOUS CYST OF THE MESENTERY.

In the *Dnevnik Kazanskaho Obshtchestva Vratchei*, Nos. 7 and 8, 1888, p. 72, DRS. I. V. UNJENIN and N. V. PETROFF, as analyzed by DR. V. IDELSON (*London Medical Recorder*, August 20, 1888), give a detailed account of the following remarkable and rare case which recently came under their observation at Professor N. N. Fenomenoff's gynæcological clinic, in Kazan. A merchant's wife, aged 26,—a well-made and fairly-nourished, generally healthy, but sterile woman, menstruating since eighteen, married at twenty,—was admitted on account of a gradually increasing and very movable abdominal tumor, with occasional constipation, fever, and headache, all of about six months' standing. Her menstruation had been regular till twenty-two, when it began to appear every two and then every three or six weeks, but always in an excessive amount and in association with pain; several months before her admission there was amenorrhœa for two or three months, but later on the flow became regular, though scanty, and accompanied with inguinal and sacral pain. At the examination the circumference of the abdomen was found to be eighty-two centimetres. About two finger-breadths below and slightly to the right from the navel there was felt a painless, smooth, elastic, globular tumor, of the size of two male fists, which could be easily moved from side to side and examined through the right, left, and anterior vaginal fornices. It was unconnected with the womb, which, as well as the vagina, did not present anything abnormal. A non-adherent ovarian cyst with a long pedicle was diagnosed, and a median laparotomy was performed by Professor Fenomenoff, under antiseptic precautions as used in his clinic (*vide* the *London Medical Recorder*, March 20, 1888, Art. 190). The peritoneum having been opened, the cyst at once bulged out from the wound. The puncture was followed by a powerful ("fountain-like") jet of a milky fluid (to the amount of two teacupfuls, or even more). The sac proved to be situated between the layers of the mesentery of the small bowel. It was extirpated mainly with the fingers, the mesenterial folds being stitched together and partially removed. The right ovary was found somewhat enlarged, the left one quite normal. Having thoroughly washed out the abdominal cavity with a two per cent. solution of borax, Dr. Fenomenoff closed the abdominal incision with three deep wire and seven superficial silk sutures, and dressed it with iodoform. The after-course was uneventful, the temperature rising only once up to 38° C. (in the evening after the operation). The last sutures were removed on the thirteenth day; on the twenty-second the patient left quite well, with a firm scar. The cyst was as large as a big apple, its walls measuring in thickness from one-half to two millimetres at various spots. Its inner surface was smooth, grayish-white, here and there brownish, the outer aspect being rough, covered with fibrous and fatty tissues. Microscopically, at the thickest spots the wall consisted of three layers, of which the inner one was lined with flat endothelial cells; abounded in connective tissue cells and dilated blood-vessels; and contained recent extravasations, as well as heaps of a yellow granular pigment. The middle layer consisted of fibrous tissue with scanty cells and vessels, but traversed with numberless islets of lymphoid tissue and typical lymphoid follicles (with reticle and lymphoid cells). At such spots where lymphoid tissue was but scanty there could be seen small patches undergoing mucoid degeneration. The outer layer contained only pure fibroid tissue, resembling that of capsules of lymphatic glands. At the thinner spots of the sac only the inner and middle layers were present. The writers think that the chylous cyst resulted from a lymphatic gland, by way of its gradual distention by the fluid stagnated, with a consecutive mucoid degeneration of lymphoid tissue under the pressure of the fluid. It is the first case of a mesenterial

chylous cyst in the Russian literature. The authors were not able to find more than nine similar cases in international literature, in five of which laparotomy was performed, with four recoveries and one death. Since none of the cases have been reported on in the *London Medical Recorder*, or referred to in Dr. R. Neale's excellent *Medical Digest*, it might be useful to adduce the cases in briefest outlines. They are these:

1. Bramann's (*Langenbeck's Archiv*, vol. xxxv.) case, referring to a nervous but generally healthy man of 63, who was admitted to Professor Bergmann's clinic with a tumor as large as a child's head, first noticed about one and a half years before. Either hydatid or dermoid of the mesentery having been diagnosed, median laparotomy was performed, about seven hundred or eight hundred cubic centimetres of a milky fluid (containing fatty globules and cholesterine crystals, but no cells) removed, and the cyst incised, stitched to the abdominal wound, and drained. The man left well by the end of the fifth week. The cyst was supposed to have developed from the cysterna chyli, through its distention and subsequent destruction of the septa, from pressure of its contents. 2. Kilian's (*Berlin. Klin. Wochenschrift*, 1886, No. 25). In a woman of 61, suffering from abdominal and lumbar pain, with vomiting and diarrhœa, there was found an abdominal tumor measuring twenty-two centimetres in diameter. It was punctured, and gave two thousand five hundred cubic centimetres of a grayish-white alkaline fluid, containing fatty globules and colostrum-like corpuscles. A month later other two thousand two hundred cubic centimetres of the same fluid were withdrawn. The cyst again refilled in four weeks, and was this time incised and drained, the woman rapidly and permanently recovering. The cyst was thought to be a distended thoracic duct. 3. Enzmann's (*Basle Inaugural Dissertation*). In a woman, aged 77, who had died from chronic endocarditis of the mitral valve, at the necropsy there was found a spindle-shaped cyst connected with the thoracic duct, which was closed lower down by an organized thrombus. The cyst, measuring nine by five by 7.5 centimetres, was situated close to the vertebral column and aorta, between the middle peduncles of the diaphragm, partly protruding into the right pleural sac, and reaching down within one centimetre from the right renal artery. It was smooth, rather flabby, thick-walled, and contained inspissated chylus of a cinnamon-brown color. 4. Kuester's (*Ein Chirurgisches Erkenntniss*, Berlin, 1882). A girl of 21 was admitted with a painful and tender, vertically movable, abdominal tumor, of the size of a child's head. A puncture withdrew a milky fluid, containing (according to Professor Salkowski's analysis) 7.24 per cent. grammes of proteids and 5.94 of fats and cholesterine, and, microscopically, fatty globules, scanty fatty degenerated epithelial cells, and leucocytes. A reaccumulation having taken place in eight days, laparotomy was performed to extirpate the cyst, which proved thick-walled, and lined internally with many layers of epithelial cells. Eighteen hours later the girl died from septic peritonitis, caused by accidentally wounding her bowels during the operation. 5. Millard and Tillaux's (adduced in Hahn's paper in the *Berlin. Klin. Wochenschrift*, 1887, No. 23). A man, aged 31, was admitted to the Lariboisière Hospital with excruciating abdominal pain in connection with a very movable tumor, which at first was diagnosed as a wandering kidney, and then as intestinal invagination. Laparotomy showed that it was a mesenterial cyst. It was extirpated, the patient making excellent recovery. The cyst was filled with a milky fluid, containing only fat and margarine crystals, but no cells. The wall consisted of three layers, the middle of which was vascular, and traversed with lymphoid tissue and dilated lymphoid spaces. The writers think that the cyst had developed from a lymphatic gland. 6. Werth's (*Archiv für Gynaecologie*, 1882, vol. xix.) case is that of a woman who first noticed a very movable supra-pelvic tumor (as large as an infant's head) three months before the operation, her attention having been drawn to it by frequent attacks of colics. Laparotomy with extirpation was performed. The tumor proved to lay between the laminæ of the mesentery of the jejunum and to contain a fluid resembling an inspissated milk. Its walls contained lymphoid tissue; in other words, the cyst was a degenerated lymphatic gland. 7, 8. Rokitansky (*Lehrbuch der Pathol. Anatomie*, third edition) describes two cases where at the necropsy there were found cysts resulting from degeneration of mesenteric lymphatic glands. In one, in that of a man, aged 53, there were present several small-sized cysts with thick walls and yellowish-white or whitish contents; while in another, in a man-servant of 36, there was found a lobulated sac of the size of a child's head, with a milky, slightly rosy fluid mixed with gelatinous red and black clumps. 9. Virchow (*Berlin. Klin. Wochen-*

schrift, 1887, No. 14) also described a case of multilocular cyst originating from degeneration of a mesenterial gland. In common with Dr. Hahn (*loc. cit.*), Drs. Unjenin and Petroff believe that the most rational method of treatment in such cases is laparotomy with extirpation (or, if the latter be impracticable, with incision into the cyst, stitching to the abdominal wound, and drainage). A single puncture is thought to be insufficient to effect a complete cure. The diagnosis is said to be very difficult, since there does not exist any reliable differential sign of the cyst in question. In none of the six cases operated upon could a correct diagnosis be arrived at before opening the abdomen.

Reviews.

FEVER. A CLINICAL STUDY. By T. J. Maclagan, M.D. Records, McMullin & Co., Philadelphia.

When in 1880 the research of Dr. H. C. Wood upon fever was published, it failed to attract any attention. It was sent to all the leading journals of Great Britain, as well as to those of this country, and we believe not one of the English and scarcely one of the American journals deemed it worthy of passing notice; while the Boston Committee of the Warren Prize, to which it was sent in competition, reported, as was published in the *Boston Medical and Surgical Journal*, that no paper worthy of commendation had been offered to the committee.

After sleeping some years, however, the great labor which was put upon this research has been recognized, and the growing recognition of the importance of the study of fever as a basal pathological process is shown by the numerous publications upon the subject, so that the literature of fever during the last year has been quite large. Nevertheless, very little has been accomplished, and the fever problem still remains about where it was left by Dr. Wood, except in so far that his results appear to have received general credence, instead of being viewed with complete indifference or scoffed at.

It is essential in the discussion of fever always to define what is meant by the term, and we find that in Dr. Maclagan's volume the word is used as synonymous with increase of bodily temperature. He says, "For practical purposes, therefore, rise of temperature may still be regarded as the test of the existence of fever, and its extent to the amount of febrile disturbance."

It seems to us absolutely proven, if fever means merely rise of temperature, that this rise of temperature is the result simply of the disturbance of the normal relations of heat production and heat elimination.

At the recent discussion before the American Physiological Society at Washington this conclusion was, we believe, assented to almost unanimously, yet Dr. Maclagan rests his whole reasoning upon the statement, "There is really no valid reason for supposing that during fever the mutual relation of heat production and heat elimination is materially altered."

The correctness of the conclusion reached by the American Physiological Society is proven by two or three facts, which seem to be firmly established, as follows: *First.* High temperature may exist at a time when the production of animal heat is not excessive. *Second.* During the high temperature of fever in the dog, although more heat is produced than in the same dog when underfed, yet less heat is produced than when the animal is gorged with meat. *Third.* There are times during pyæmic and other fevers when the tissue-change and the heat production proceed with great rapidity, although the bodily temperature is below normal on account of the excessive loss of heat.

As every one knows, there are two distinct theories of the mechanism of fever. One is that the rise of temperature is the result of primary disturbance of the nervous system. The other is that the fever poison acts directly upon the liquid or solid tissues of the body, so as to provoke an excess of heat production, which excess of heat production causes in turn rise of the bodily temperature. Dr. Maclagan adopts both theories. He is forced to acknowledge that the neurotic theory is sometimes true, or, in other words, that there is a neurotic fever. But he believes that in most cases of disease the fever is metabolic; in other words, is due to the direct action of the poison upon the tissues. This metabolic theory seems to us to require as its basis the premise laid down by Dr. Maclagan, that fever is the result of excessive tissue change. A premise which we believe to be false. We are unable to see any force whatever in the arguments which are brought forward by Dr. Maclagan upon pages 37 and 46 of his book, as disapproving the neurotic theory. He says, "This action ought to be more and more pronounced as the poison which gives rise to it increases in amount in

the system, and the temperature should go on rising as the disease advances, getting daily higher and higher, and keeping pace in its rise with the increasing prominence of the other symptoms, — wasting, prostration, delirium, etc. It ought, too, to remain high so long as the poison exercised a direct toxic action on the heat-inhibiting function." We agree with the statement of Dr. Maclagan that the facts are quite the reverse to statements in his paragraph; but we do not see why the temperature should go on rising as the disease advances any more under the neurotic than under the metabolic theory.

There is no proof, that we know of, indeed we may say that there is no evidence that the poison which provokes the fever in the case of typhoid fever exists in larger quantities in the body during the third week than during the second week, since it is extremely doubtful whether the original typhoid poison is the immediate cause of the fever, or whether the fever is produced by secondary products. If the fever in typhoid be of nervous origin, and be really due to the nervous exhaustion, we can readily understand why getting out of bed shall, by exhausting the nervous system, increase the fever. But, under the metabolic or chemical theory, the influence of exertion on temperature in such a case is very mysterious.

To follow the interesting but not always correct reasoning of Dr. Maclagan through the one hundred and sixty-five pages of his essay would of course require far more space than can be given in the columns of the THERAPEUTIC GAZETTE, and we must, therefore, dismiss the book with the notice of only one more point. Dr. Maclagan objects to the conclusion of Dr. Wood: "External heat applied to the body of normal animals, including man, so as to elevate the internal temperature, produces derangements of the functions of innervation, of respiration, of circulation, etc.," "because," says Dr. Maclagan, "there are no grounds for 'including man' in the general inference which he draws. No observations were made on man, and in this matter the results of experiments made on cats and dogs cannot be accepted as applicable to him." If Dr. Maclagan had happened to live in a hot climate instead of a cold one, he probably would never have written this sentence. Numerous observations have been made by Dr. Wood and numerous other clinicians upon man. The complete failure of Dr. Maclagan to grasp the essential core of this subject is shown by the following statements: "Man naturally eliminates through his skin an enormous amount of heat, and possesses a power of accommodating himself to high temperatures, which is not possessed by the animals experimented upon by Dr. Wood. The temperature which he found proved fatal to cats and dogs is one to which man may be and constantly is exposed without serious results. Every time we take a Turkish bath we are exposed for a length of time to a higher temperature than that to which Dr. Wood's animals were exposed."

Of course, man eliminates heat and resists external temperature better than do the lower animals. But this has nothing to do with the effect of heat upon the tissue when the external temperature is so high as to cause an elevation of the bodily temperature. A man and a dog go into a Turkish bath. The dog suffers because he is not able to keep himself cool; the man keeps himself cool and does not collapse. When the external heat is so great, however, that the man cannot keep himself cool, his temperature rises, then he, like the dog, suffers. In either case, thermic fever occurs with similar symptoms, only the man resists the production of thermic fever better than does the dog.

ON THE ANIMAL ALKALOIDS, THE PTOMAÏNES, LEUCOMAÏNES, AND EXTRACTIVES, IN THEIR PATHOLOGICAL RELATIONS, BEING A SHORT SUMMARY OF RECENT RESEARCHES AS TO THE ORIGIN OF SOME DISEASES BY OR THROUGH THE PHYSIOLOGICAL PROCESSES GOING ON DURING LIFE. By Sir William Aitken, Knt., M.D., F.R.S., etc.

Philadelphia: P. Blakiston, Son & Co., 1887.

The subject of this little book is one even yet but little known to the profession at large, and still less considered in its important bearings. How much it may lead to in the future no one can tell. It is allied in one way to bacteriology, and in another antagonistic to it. It searches for causes of disease other than microbic, yet possibly in many cases dependent upon these minute organisms, and interrelated with them in the causation of certain diseases and diseased conditions. While the study of ptomaïnes and leucomaïnes has advanced, the author tells us, to a certain distance, and is daily advancing, the "extractives" have yet to have their nature found out; "but this much we know of them, that while we are assured that the ptomaïnes are toxic and the leucomaïnes are also toxic, these unknown extractives are more toxic or poisonous to the system than either." Of the resemblance of the animal cadaveric alkaloids

to vegetable alkaloids the author says, "Animal and vegetable alkaloids are similar in their chemical constitution, and that they are both products of albuminous or proteid decompotion; and that some at least of the so-called ptomaïnes are identical with vegetable alkaloids." This is a matter not only of medical but of the greatest medico-legal importance; in fact, we are in dealing with certain widely-used animal substances like children playing with deadly explosives. Brieger has shown "that by digesting fibrin with artificial gastric juice" an alkaloid can be obtained to which he gives the significant name of peptotoxine. Already more than one observer of eminence has warned us against the indiscriminate use of digestive ferments and artificially-digested foods now so common. "It is possible that digestive ferments, like other powerful agents, may be edged tools." And not only do we manufacture deadly poisons when dead, but living, and as a product of vital physiological processes, and so there is opened to us the view of the possibility of alkaloids being formed "independent of bacterial fermentation."

The author gives us a list of discovered alkaloids, and mentions some conflicting clinical facts which may be cleared up by the light thrown upon them from this source. "In certain cases (uræmia, for example) there is to be observed an elevation of temperature, while in certain other cases the temperature may be normal. But once it has been determined that when 'extractive matters' accumulate in the blood we detect hyperthermia, and, on the other hand, if 'alkaloids' accumulate, we have hypothermia, while, if the two factors coexist, they may neutralize each other, . . . so that the temperature may remain stationary or normal, while should one or the other predominate, immediately the scale is turned." As to how this autoinfection takes place the author gives us considerable information and much more speculation. Also he inquires into the question, "How do we resist the constant autoinfection to which we are constantly exposed?" This he answers also by stating that elimination through secretion and the destruction of the poisons by oxygenation are the factors in our preservation from day to day. Several very interesting cases are given to show how autoinfection may result from excessive production, by fatigue, and in other ways, the emunctories remaining sound and normal. The "typhus of armies" owes its causation not only to overexertion but also to overcrowding, according to the author, who evidently inclines to believe in the generation of typhus *de novo*, a view which may more readily be held concerning this disease, perhaps, than any other so-called contagious affection. While many will view the author's deductions as often unsound, one cannot fail to read them with interest, in view of the new discoveries he presents in dealing with possibilities rather than certainties. But among them all, speculative as many of them are, there may be many truths of the utmost importance. Deduction from facts gives the only value to facts. The natural antagonism between the theory of the action of ptomaïnes, etc., and the bacterial theories of to-day is fully recognized in these pages. "In recent years we have heard and read much as to the malignant and mysterious influence of bacteria, bacilli, and germs as causes of disease." "But as yet no one has succeeded in making out the manner in which such microbes act, or the causal relation which exists between them and disease." "Certain it is that molecular death precedes all evidence of the existence of the bacterial microbes." "We cannot avoid swallowing numbers of them with our food and inhaling them with our breath." Invasion of the system through the mucous membrane may thus start in "special circumstances;" and these special circumstances are, the author remarks, the antecedent "unknown factors which combine to bring about disease." The microbes are "entirely *post hoc* as to their existence in relation to the antecedent factors of any particular disease." The author also is gratified to learn "that the researches of Gautier, Peter, and others may help to emancipate" us from microbic and bacterial tyranny. E. W. W.

A Text-Book of Pharmacology, Therapeutics, and Materia Medica. By T. Lauder Brunton, M.D., D.Sc., F.R.S. Adapted to the United States Pharmacopœia by Francis H. Williams, M.D., Boston, Mass. Third Edition.
Philadelphia: Lea Brothers & Co., 1888.

We are very well pleased to welcome to our editorial table the third edition of this book of Dr. Brunton's, which preserves the peculiar characters which rendered so attractive the first edition of the book. Our readers, no doubt, will remember that it is divided into six sections. The first of these sections occupies some five hundred out of the twelve hundred pages which make up the whole volume. It, to our thinking, is the most valuable portion of the book, and is really a treat-

ise upon physiology with special relation to drugs, containing much curious and interesting knowledge, which does not usually find its way into books either upon pharmacology or therapeutics. We think that but few of the readers of the THERAPEUTIC GAZETTE would not in perusing this section find great pleasure to themselves and advantage to their patients.

We have noticed recently in the columns of the THERAPEUTIC GAZETTE a discussion concerning fallacies which grow out of the use of terms, and we must acknowledge to a sense of regret in finding that Dr. Brunton sometimes means one thing by a term and sometimes another. Thus, a vascular stimulant is a substance which paralyzes the coats of the blood-vessels, and thereby causes dilatation, and a vascular depressant one which stimulates the coats of the arteries, and thereby contracts their lining. In regard to this last, the words stimulant and depressant are used in their old meaning,—a cardiac stimulant increases and a cardiac depressant decreases the functional activity of the affected viscus; but in regard to the vessels the terms are reversed,—the vascular stimulant depresses functional activity and the vascular depressant stimulates functional activity. Closely allied to this lack of uniformity in terms is the lack of uniformity of terminology; *ine* is now the recognized termination for an alkaloid, but we find that Dr. Brunton spells the name of the alkaloid thall*ine* thall*in*, but saccharin, which, we believe, is not an alkaloid, he spells saccharine.

It is true that Dr. Brunton carefully guards against confusion in the mind of the reader by defining his terms with his usual perspicuity, but such contradictory use of scientific terms must lead to confusion in discussion, if not in the thought, of the student.

In carefully going over the section which treats of the individual drugs, we find that at least in some cases the matter has not been brought fully abreast of recent researches. Thus, there is no mention whatever of such an important alkaloid as hyoscine, the activity of hyoscyamus being attributed solely to the alkaloid hyoscyamine. In the article on antipyrin there is no mention at all of the use of the drug as an analgesic or as an anticonvulsive, as in various forms of pain, epilepsy, whooping-cough, etc.; nor is there anything said of such use of antifebrin. Then, again, such important recent drugs as ichthyol, salol, amylene hydrate, find no mention at all.

A GUIDE TO THE PRACTICAL EXAMINATION OF THE URINE. FOR THE USE OF PHYSICIANS AND STUDENTS. By James Tyson, M.D., etc. Sixth edition, revised and corrected, with a colored plate and wood engravings.

Philadelphia: P. Blakiston, Son & Co., 1888.

THE ESSENTIALS OF MEDICAL CHEMISTRY AND URINALYSIS. By Sam. E. Woody, A.M., M.D., etc. Second edition, revised and enlarged, with eighty-five illustrations.

Louisville: Jno. P. Morton & Co., 1888.

The latter of these books covers the ground of organic and inorganic chemistry, as well as the chemistry of the urine. The general scope of the work, however, is not large, and but a slender knowledge of chemistry is given, but probably about as much as the average student succeeds in carrying away with him after his longer or shorter term of study. Viewed in this light, the book may be recommended as a short summary of essentials, which is all it claims to be.

Dr. Tyson's work, now in the sixth edition, is long since a standard text-book, and is well known to our readers. It is, as its title indicates, thoroughly practical, sound, and plain, and in all respects just what such a book should be. The author has omitted whatever he could safely omit, and added considerable new matter. The preface tells us that "the most important additions have been the new tests for sugar by phenyl-hydrazin hydrochlorate and by alpha-naphthol and thymol. The phenyl-hydrazin test is very new, and its value yet uncertain. Not only is it tedious, involving a carefully-prepared solution of accurate strength, but the water-bath has to be continuously applied for an hour in making the test, and to discover if sugar be present, the crystals of phenyl-glucozazon, the microscope must be employed. Even then the nature of the crystals must not be left to the eye alone to decide, but they must be dried and their melting-point determined, involving re-solution and recrystallization, and very delicate manipulation with heat and thermometer." A modification, which simplifies the process somewhat, is also described.

The alpha-naphthol test is less intricate and exceedingly delicate; in fact, the extreme delicacy, as the author has formerly pointed out in regard to another somewhat recent test,—picric acid,—which was supposed to show traces of sugar in the normal urine, is too delicate to be useful. Picric acid, however, is now cleared from the aspersion, and the change of color produced by it in almost any healthy urine by adding potash

and using heat, is now considered to be due to the presence of creatinin.

For those who desire certainty and do not mind trouble and apparatus, polarimetry, so carefully and clearly described by Dr. Tyson, will be the best; and, in the matter of all tests, we cannot help saying that Dr. Tyson's book describes their method so clearly that any one with any knowledge of chemical manipulation, and many with no previous acquaintance with the subject, can easily follow him and achieve success.

E. W. W.

THE EAR AND ITS DISEASES; BEING PRACTICAL CONTRIBUTIONS TO THE STUDY OF OTOLOGY. By Samuel Sexton, M.D., Aural Surgeon to the New York Eye and Ear Infirmary, etc. 460 pp., octavo.
New York: William Wood & Co., 1888.

In this work Dr. Sexton has not attempted to present to the profession a treatise on the ear, but has embraced in his book particular subjects, on which he has bestowed special thought and investigation. This makes the book one of interest to both special and general reader.

In studying the functions and diseases of the ear, the author has endeavored to avoid the too exclusive consideration of local conditions, since otology, in its broadest sense, should embrace a consideration of the upper air-tract, of which the middle ear forms but a part, and also of regions contiguous to the ear.

The subjects introduced into the work, and which present features not usually made so prominent in works on the ear, are catarrh of the upper air-tract; oral irritation, specially dentition and diseased teeth; sea-bathing; wounds and injuries of the ear, occurring in warfare and civil life; rupture of the drum, from boxing the ear, and its medico-legal aspect; concussions from the blast of great guns and explosives; anomalies of audition, noises in the ear, and their connection with the hallucinations and delusions of the insane.

There are also considered: the effects of false hearing on singers, actors, lecturers, and musicians; othæmotoma in lunatics, pugilists, and others.

The operation of excision of the drum-head and the ossicles of hearing for otorrhœa, and deafness due to chronic catarrh of the middle ear, including a full account of the literature of the subject, is fully set forth in this valuable work. "The results of this operation have been satisfactory, and it is hoped its usefulness will be confirmed by experience." The author also considers the important topic of the "classification and education of school-children with defective hearing," and "the effect of high atmospheric pressure on the ear in tunnels, caissons, and in diving." The increase of submarine labor of late years makes it very important that the effect of such work on the ear be understood. The subject of pension claims of soldiers, sailors, and marines on account of disability from deafness is also discussed.

The book we have thus briefly noticed shows the great advances made in otology within the last ten years, and also how eminently the author has produced that advance by his patience and sagacious observation of all that pertains to his specialty.

C. H. B.

DISEASES OF THE MALE URETHRA. By Fessenden N. Otis, M.D.
Detroit, Mich.: Geo. S. Davis, 1888 (Physicians' Leisure Library).

The object of this book, its author writes, "is more especially to deal with the urethra and its diseases rather than with the results of such difficulties;" therefore its scope is a very limited one; indeed, the book is scarcely more than an outline of a very few affections of the urethra, but it serves to call attention to the more elaborate and excellent works by Dr. Otis upon the same diseases, the study of which we recommend to all.

The section which treats of gonorrhœa is the most interesting, and as his method of treatment is somewhat different from that generally found in the books, we have selected it for special notice. In regard to the specific nature of this disease, in so far as it is due to a special micro-organism, the author, we believe, has adopted the most satisfactory view when he says "he accepts these micro-organisms as an evidence of acute inflammatory origin of a discharge, but not as necessarily due to a specific microbe." While admitting the presence of the gonococci in a urethral discharge is evidence of a gonorrhœal origin, Dr. Otis is not yet prepared to accept the claim that urethral disease may not have its origin in various causes independent of the presence of the gonococci. In a word, a gonorrhœa may exist in which the cause, symptoms, contagious nature, and termination in no way differ from one in which the gonococci are to be found, but in which no such micro-organisms are present.

The treatment of gonorrhœa by the author is based upon a study of the various methods

given by different writers, and his investigations lead him to the following conclusion: "The average duration of all the cases thus variously treated, in point of time, was practically the same." The so-called internal specifics which are recommended for this affection, Dr. Otis, we think very properly, condemns; but the local employment of suitable injections we are more inclined to favor than does the author. The method advised consists in rest, hot water, and diluents, with alkalies, especially the employment of retrojections of hot water. This plan while it may be very good, we think, in the majority of cases is not practicable.

NASAL POLYPUS, WITH NEURALGIA, HAY FEVER, AND ASTHMA, IN RELATION TO ETHMOIDITIS. By Edward Woakes, M.D., Lond., etc. With illustrations.
Philadelphia: P. Blakiston, Son & Co., 1887.

The author has become possessed with the idea that the condition "lightly spoken of as hypertrophy of the middle spongy bone is *de facto* an ethmoïditis," with possibilities of necrosis and proliferation. This view, he thinks, will reduce the "previously inchoate notions" to an "intelligible scheme." In necrosing ethmoiditis in its first stage, therefore, and as it passes into what he describes as the second stage, he advocates vigorous treatment. The galvano-cautery is made to penetrate the "boss-like prominence to the bone" in numerous places, or a sufficiently strong acid—glacial, acetic, chromic, nitric—may be substituted. We are told for our encouragement that the requisite dexterity for this "delicacy of manipulation" is "sufficiently easy to acquire." The author has an instrument for it also, as what author has not? Even with the author's presupposed dexterity "a young married lady was seized with a slight epileptic fit" during the application of chromic acid. The author adds, that "subsequently it was ascertained that this patient was subject to seizures, accompanied with momentary loss of consciousness," but, like Mr. Toots, "she had not attached any importance" to them. This case the author believes to be one of "epileptiform conditions associated with nasal disease," while we should rather associate it with nasal applications.

Upon ethmoiditis and its recognition depends also the successful treatment of hay fever, asthma, reflex disturbance of the circulation of the eye, paresis of the larynx, neuralgia, and a host of other affections, for the knowledge of all which, and of how much can be done for their relief by the study of ethmoiditis, the reader is referred to the volume itself.

E. W. W.

PHYSICIANS' LEISURE LIBRARY. THE MODERN TREATMENT OF DISEASES OF THE LIVER. By Professor Dujardin-Beaumetz. Translated from the fifth French edition by E. P. Hurd, M.D., Newburyport, Mass.
Detroit, Mich.: Geo. S. Davis, 1888.

In a prefatory letter the author acknowledges his satisfaction with the translator's work, and, without any comparison with the original, we think the reader will be willing to accord Dr. Hurd ample praise for having given the American reader a readable, fluent, and satisfactory translation. After a discussion of the liver from a therapeutic stand-point, chapter ii., on "Cholagogues," gives us an admirable summary of the most recent discoveries of experimental therapeutics. The whole field of cholagogues is gone over, and each remedy is disposed of by the author in the light of his own clinical experience. The vexed question of the action of calomel and other mercurials in the light of recent experiment is discussed. The author, while abandoning calomel as an agent capable of increasing biliary secretion, believes the bichloride to possess that power. The newer vegetable cholagogues he finds of little real value, except euonymin and hydrastin. Just why in Rutherford's table we find one result from bichloride of mercury and a different one a few places down the list from corrosive sublimate, we cannot say, or whether the error exists in the original table or not.

Having cleared the way, the author then proceeds to the subjects of treatment of biliary lithiasis, jaundice, engorgements of the liver, and hydatid cysts. The very little understood hydrotherapy of the liver receives very close attention, and will prove of especial value to the American reader.

E. W. W.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. A WORK OF REFERENCE FOR MEDICAL PRACTITIONERS. 1888. Sixth year.
Boston: Jno. Wright & Co.
London: Hamilton, Adams & Co., etc., 1888.

The arrangement of the "Annual" is slightly different this year from last. There is an initial section, devoted exclusively to "new remedies," followed by the second and final section, devoted to "new treatment." This makes the task of finding any given topic much easier, and, in this day of new remedies, is a very important matter. The pages are alphabetically arranged, with plain head-

lines, and we cannot imagine a more useful work of its kind. The amount of condensed new information is enormous, and a study of the book throughout would put a professional Rip Van Winkle on a level with his medical brethren, if his sleep had not been too long. This book is the outgrowth of our own vicious system of medical publication. One here at once discards the twice-twenty-times-told tales which make up all the bulk of new volumes, and gets at the real new work of the past year, free from chaff and hull and husk, in the pure, bright, shining grain. The book is not much beyond pocket size, nicely printed, with nearly six hundred pages of reading-matter, and its editors number twenty-two, among whom are W. H. Elam, J. Milner Fothergill, J. Hutchinson, Jr., Powers, James, Skeene, Keith, Urban, Pritchard, Thomas Savage, and Percy Wilde, names which warrant the soundness of the work, and are a warrant that it represents the last phases of the ever-waxing, never-waning science of medicine.

E. W. W.

PRACTICAL ELECTRO-THERAPEUTICS. By Wm. F. Hutchinson, M.D.
Philadelphia: Records, McMullin & Co., Limited, 1888.

This book bears on its title-page the sentence, "That he who runs may read." We have read it in a sitting posture, and perhaps failed to take in all its merits. There are undoubtedly good things in the book, but there is also evident here and there a manner too empiric and too little scientific, a tendency to believe in electricity as a cure-all, and a series of cases, many of which might figure well in the advertising sheet of some self-styled electrical physician. The tone of the book, too, in some places, especially in treating of sexual diseases, is not quite guarded enough, and yet the very absence of technicalities and the evident charm of the author's literary style commend it to the unprofessional reader.

In electricity as a curative agent in hysteria the author has full faith, and his advice as to method in its using is by no means bad. "It is not only the muscle-fibre that must be treated, it is the will," and he advocates the battery in these cases as an indirect, disguised, but real method of corporeal punishment. In looking over the author's successful cases one finds a great range of disease overcome by the battery. Whether in other hands acute rheumatism, the convulsions of children, epilepsy, marasmus, incontinence of urine, asthma, and skin-diseases will yield so magically remains to be proved. The author's method can be readily followed by any one at all acquainted with the subject, since his directions are plain and explicit. E. W. W.

LESIONS OF THE VAGINA AND PELVIC FLOOR. WITH SPECIAL REFERENCE TO UTERINE AND VAGINAL PROLAPSE. By B. E. Hadra, M.D., Austin, Texas. Eighty-three illustrations.
Philadelphia: Records, McMullin & Co., Limited, 1888.

A MANUAL OF THE MINOR GYNÆCOLOGICAL OPERATIONS. By J. Halliday Croom, M.D., etc. First American from second Edinburgh edition. Revised and enlarged by Lewis S. McMurtrey, A.M., M.D. With numerous illustrations.
Philadelphia: Records, McMullin & Co., 1888.

Although not, perhaps, covering the same identical ground, the pathways of these books run side by side. The first aims at elucidating the causes and treatment of malpositions of the urogenital system, but includes all gynæcological injuries to the vagina and pelvic floor. But the main idea is the treatment of prolapses, uterine and vaginal. With this idea the author has spared the reader an infliction of all the literature on the subject, and has produced a very useful book.

Dr. Croom covers the same ground and more with his manual of minor gynæcology. Of course there are many books on the same subject in the market, all recent; but we see no reason why this one should not find its place, if for no other reason, from its size, for it is small, unpretentious, and condensed. The illustrations of both these books are full, and while not gems of art, show what the authors desire to show. E. W. W.

THEINE IN THE TREATMENT OF NEURALGIA, BEING A PHYSIOLOGICAL CONTRIBUTION TO THE THERAPEUTICS OF PAIN. By Thos. J. Mays, M.D., etc.
Philadelphia: P. Blakiston, Son & Co., 1888.

This beautifully-bound and printed volume contains a very earnest effort by the author to bring into notice the neglected alkaloid theine. At the beginning of his experiments the author was met with the hitherto but little known fact that "theine, guarana, and caffeine were manufactured indiscriminately from coffee, tea, kola-nut, Paraguay tea, and guarana, and that they were all sold out of the same bottle, and labelled according to the demands of the trade." This simple and beautiful state of affairs necessitated some study as to which was theine, and whether there was any such thing as theine, a research from which the author emerged triumphantly with the coveted alkaloid, its identity estab-

lished firmly, and proceeded with his experiments from a sound and secure basis. The clinical cases narrated as showing the value of theine are derived not only from the author's own experience but from that of many of his friends, and seem to establish the fact, if a fact nowadays ever can be established, that in theine we possess an invaluable agent for the relief of certain varieties of pain.

E. W. W.

PHYSICIAN'S INTERPRETER. IN FOUR LANGUAGES. SPECIALLY ARRANGED FOR DIAGNOSIS. By M. von V.
Philadelphia: F. A. Davis, Publisher, 1231 Filbert Street, 1888.

M. von V. has had some hospital experience, and has been frequently called upon to interpret for foreigners, but that only makes it the more curious that he should supply the physician with so many questions and so few answers, and were the answers ever so many, how could one find them on the spur of the moment? With labored effort the conscientious doctor, who has an Italian patient, hunts up the question, "Come vi sentite il capo?"—"How does your head feel?" It was hard to find this extremely vital question; but when the patient responds in a flood of voluble Italian, how is he to understand the answer? Perhaps he hands the book to the patient, and, after teaching him to read, they together painfully endeavor to find something suitable. The index professes to classify the sentences, but even with the poor help it supplies we fear that the physician will never know how any poor head but his own feels, and for that he will need no interpreter; in short, we cannot see exactly the vacancy which this book will fill.

E. W. W.

THE THEORY AND PRACTICE OF THE OPHTHALMOSCOPE By John Herbert Claiborne, Jr., M.D.
Detroit, Mich.: Geo. S. Davis, 1888 (Physicians' Leisure Library).

The employment of the ophthalmoscope in the practice of medicine, outside of its special application in diseases of the eye, has now been made so essential to the general practitioner that a knowledge of its principles and some familiarity in its application are required in order to satisfactorily practise medicine. To substitute the instruction of a competent teacher to overcome the difficulties that beset the beginner in endeavoring to obtain a knowledge of the ophthalmoscope and its use is certainly very often desirable, and any attempt in this direction is commendable. This small book by Dr. Claiborne seems to be well suited for the purpose for which it was written; his experience in teaching has given him an opportunity to learn the wants of beginners, and he has succeeded in writing a very useful book.

ABDOMINAL SURGERY. By Hal. C. Wyman, M.S., M.D. Detroit, Mich.: Geo. S. Davis, 1888 (Physicians' Leisure Library).

Why the above book has been written and published the author in his preface says, "Is to aid students and practitioners in the elementary study of abdominal surgery by a plain presentation of facts." That it is elementary there can be no question; that it is an aid we very much doubt. Indeed, the book, considered as a work for the study of this branch of surgery, is useless. It is impossible to treat this very important subject in the space occupied by our author.

Correspondence.

PARIS.

(From our Special Correspondent.)

In the September number of THE GAZETTE, page 635, allusion was made to some conclusions arrived at by Dr. V. Poulet, of Plancher-les-Mines, respecting the nature of the *acid principle of gastric juice*. The note in question has been supplemented by an explicit memoir which proves in many ways most important. For one thing at least, it will set aside —for good it is to be hoped—that chemical heresy,—namely, the theory of free muriatic acid existing in the presence of organic salts. Dr. V. Poulet holds that (1) the gastric juice of adult omnivorous animals, healthy man, for instance, contains in the first part of digestion hippuric acid alone. Near the end of digestion tartaric acid also makes its appearance. As an exception the two acids may be found, in dyspeptic subjects, present together, from the beginning of the digestive process. (2) The stomachs of all young animals, before weaning, contain almost no other acid than tartaric. (3) All adult carnivora, dogs included, have free tartaric acid in their stomachs. Hence dogs should not be chosen for comparative gastric juice investigations and experiments; but pigs should be preferred, owing to the similarity of their dental and digestive system. (4) The gastric juice of

man, sick or well, never was found, in the experiments tried, to contain lactic or sarcolactic acid; the same was true of animals. (5) Hippuric acid extracted from the gastric juice possesses all the chemical properties of the same acid found in the urine of herbivorous animals. But tartaric acid of like origin somewhat differs from the vegetable acid. It will, for instance, effervesce with sulphuric acid, when heated, and present otherwise some of the racemic acid (para-tartaric) characteristics. (6) The behavior of dialyzed gastric juice with colored reagents is not at all that of free muriatic acid, but that of hippuric and tartaric acids or their acid salts. (7) The intestinal secretion helping to complete the digestive process is invariably acid, and is rendered so by a tartaric acid of the variety already noticed. The foregoing conclusions of Dr. Poulet have been supported by an abundance of experiments, related at length and with all details and minutia, so that any one may repeat and criticise them. They cannot, of course, be related here; but some of the most important operations deserve a short description. To begin with, hippuric acid was obtained as follows from a pig's stomach. The mucous portions were scraped off and placed on a dialyzer with nothing but water; after twenty-four hours the dialyzate was evaporated, at a gentle heat, down to 30 c.c., and a slight excess of sulphuric acid added. The bulky precipitate thus formed was pressed out in bibulous paper, redissolved in lukewarm distilled water, and recrystallized by evaporation. Perfectly white hippuric acid was thus obtained and identified by all the chemical tests known for the substance. The average yield of an ordinary stomach was found to be thirty centigrammes (five grains). The same operation was performed, with some variations, on human gastric juice. In one instance a man was asphyxiated in a mine well after taking his meal, and some gastric juice secured during the autopsy was submitted to dialysis. In another, a healthy man scientifically inclined allowed his stomach to be washed and pumped out after a meal. In both cases hippuric acid was obtained by dialysis. Tartaric acid can be secured by the same process,—namely, dialysis with nothing but water. In this respect some obscure points still need elucidation, but it must be admitted that there are very good reasons to conclude that hippuric acid, and not muriatic, is the acid principle of human gastric juice.

A case of *carbonic oxide poisoning*, which occurred not long since in Paris, will bear relating in detail because one of the victims survived, and it is seldom in such cases any one lives to tell the tale. The accident itself was commonplace enough. Two young men, G. and R., aged respectively 18 and 32, were, during sleep, poisoned by carbonic oxide fumes escaping through a defective flue. The younger man was found dead in the morning. The other, R., was unconscious, but, on being taken to the Tenon hospital, he eventually recovered after long sickness. The chief interest lies in the post-mortem, as well as in the symptoms presented by the survivor. According to Dr. Gabriel Pouchet's official report, the autopsy brought out the following particulars which deserve to be here noted. The blood was bright red, with slight purplish reflections; the heart showed no organic lesion; the right ventricle contained blood-clots; the trachea and lungs were bright red; the bladder held about 109 c.c. of slightly bloody urine. The serum extracted from the peritoneum, also the blood, were spectroscopically examined, and both plainly gave the oxycarbonic hæmoglobin spectrum. Next, 100 c.c. of the blood were placed under the mercury air-pump, and yielded 32 c.c. of a gas which subsequent analysis proved to consist of 20.4 per cent. carbonic acid, 8 nitrogen, 2 oxygen, and 1.89 per cent. carbonic oxide. The oxide, on being dissolved out with cuprous chloride and set free again, answered all the chemical tests of identity, thus confirming the spectrum indications. As no traces of mineral or organic poison could be detected either in the blood or urine, the expert averred there could be no doubt as to the cause of death,—namely, inhalation of carbonic oxide. The case of the survivor was no less instructive. Sixty-four hours after the accident he was still dazed and mentally torpid. He only remembered having gone to bed in good health and spirits. He had no recollection of feeling giddiness or vertigo during that night. From the hospital nurse it was learned R. had been brought unconscious, and recovered but slowly; no fever, nausea, vomitings, or diarrhœa had occurred. Only a slight gastric trouble was apparent. The appetite was slight; thirst, not excessive. The patient complained of no pain. The urine was normal in quantity and composition, containing no sugar, no albumen, and no biliary pigments. The lungs, heart, liver, and spleen were unaffected; there was no paralysis, no visual disturbance, no buzzing in the ears, and no vertigo. In fact, no symptoms were apparent but weakness of the knees when standing. And yet the patient's blood still con-

tained carbonic oxide, as the following experiment demonstrated. About 6 c.c. of blood were extracted by scarified cupping from the lumbar region, and submitted to examination. On diluting the liquid with boiled distilled water the spectrum of oxycarbonic hæmoglobin was very clearly apparent. After fifteen hours' exposure the spectrum appearance was sensibly the same, and the blood left unprotected for a week at the laboratory's temperature, showed no sign of putrefaction. Of course the expert concluded to carbonic oxide poisoning. But it is a striking fact that so evanescent a substance as a gas should, after sixty hours, be clearly identified in a dead body, and that the poison should cling so tenaciously to the living.

The danger of *collecting fœtuses* here is illustrated by the following which occurred not long since. A medical student, having secured his doctor's diploma, bethought himself of setting up in business and getting married. But as he had, like many hospital internes, several specimens of moles, fœtuses, etc., preserved in alcohol, it struck him such things would hardly please a new bride, and thoughtlessly emptied out his wide-mouth jars into the privy. Unfortunately, the scavengers were called in a few days later, the relics were found, an inquest was held, the young man implicated, and things looked threatening for him, as French law is quite severe about desecration of human remains. Luckily, he was dealt with by a very Parisian magistrate, who took a lenient view of the offence, and hushed up the affair, after administering a sound lecture. But the intended bride got shocked with the occurrence, and the matrimonial alliance—a very desirable one in every respect—was hopelessly and definitely broken off.

The efficacy of *olive oil in biliary calculi* has been put to the test in the Paris hospitals. The results have in the main been satisfactory, but as the mode of action cannot be readily explained, French physicians appear unwilling to be convinced. For instance, Dr. Chauffard last week related at a meeting of the Hospitals' Medical Society that he and his interne, Dr. Dupré, had tried in his service the olive oil treatment recommended by Dr. Just Fouatre, of New Orleans. Several female patients, aged from 45 to 60, of an arthritic and obese habit, and suffering from hepatic colics, were given the usual dose,—namely, 12 ounces of the oil in two portions, administered at fifteen minutes' interval. In all cases much benefit was experienced, and within seven or eight hours after taking the medicine numerous concretions, of a greenish color, semi-solid, and in size varying from a pin-head to a walnut, were evacuated. But pharmacist Villejean, of the Hôtel-Dieu, analyzed the excretions, and found them to consist chiefly of neutral fats and free fatty acids, with but little cholesterine. Besides, a cholesterine calculus on being left in contact with olive oil will lose none of its weight. So, Dr. Chauffard concluded, it cannot be admitted that the olive oil exhibited should reach the biliary ducts and there soften the calculi. True, in one of the evacuations real cholesterine concretions were found, but Dr. Chauffard thought the fact to be a mere coincidence, the purgative motion having carried off some calculi ready to be expelled. Yet in the main he was compelled to admit the treatment was successful. Without expressing here an opinion on the efficacy of olive oil, it may be remarked that for a long time colchicum was excluded from regular practice, because its action could not be accounted for, and its use was left to quacks and patent medicine men, who made fortunes with gout pills and potions containing colchicum. At the same time Dr. Chauffard must be recommended for so fairly stating the facts, although they favored a theory which he opposed.

The cure of snakes' bites by *cedron nut* has been more than once affirmed and denied, some considering it almost an article of faith, others calling it a superstition. It will, therefore, be of some interest to hear of the experience of a disinterested and reliable person, Dr. Bousseau, of Luçon (Vendée). He said, "Last June I was called, early in the morning, to attend on a carpenter, aged 19, who had been an hour before bitten by a viper. The patient had vomited abundantly, lost consciousness, and was on his bed, where I saw him; his little finger—the bitten part—was much swollen and so was his hand; his pulse slow and threadlike; his skin cold and colorless. I touched the wound with ammonia to please the family, and prescribed 1 cedron nut, powdered, to be taken in 2 ounces of strong white wine. I also ordered another nut, powdered, mixed with 3 drachms of seventy per cent. alcohol, to be applied as a poultice to the wound. For a while the patient could not be persuaded to take the medicine, and the vomitings continued. But I made him swallow it, and soon after the vomitings ceased; he rapidly grew better. At noon he began to recognize the persons standing by his bed; soon he felt hungry, was allowed broth and milk, and I considered him out of danger. He eventually recovered, but the bitten finger was very long healing. I

would not from one case conclude to the absolute value of cedron nut as a snake-bite antidote, but I am convinced it did save this patient's life, and I am all the more inclined to this opinion that eight days later, in the same district, a young man of 18 was bitten by a viper and died in consequence."

Dr. Laborde, who is now investigating the poisonous properties of some *liquor flavorings*, related the other day (October 16) at the Academy of Medicine the following instance. He was with his assistants experimenting with "Essence de Noyan," an artificial kirsch flavoring, made with benzonitrite and benzoic aldehyde. A well-known scientist who was visiting the laboratory took hold of the vial, and, although cautioned against it, would take a good smell at the stuff. Suddenly the imprudent man grew pale, was taken with dizziness, and felt so faint that he had to be helped to his carriage and driven home at once. As a consequence he was for eight days confined to his room, and said he would never forget his experience.

PARIS, October 19, 1888.

GELSEMIUM SEMPERVIRENS.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—Your issue of October 15 contains a selection under the above caption from the pen of Dr. G. M. Garland, in the *Boston Medical and Surgical Journal* of September 13 last. The perusal of it afforded me much pleasure and considerable information, and as my experience with the remedy extends over a long period, and contains some further items which may be of general interest and utility, I beg a space in your columns. By the way, how extremely common it is to find this remedy miscalled, GELSEMINUM being its usual appellation according to my experience!

Neuralgia of the Face.—While gelsemium has an undoubted effect upon neuralgias of the fifth pair of nerves, yet I am certain, from observation, that its elective action is upon the inferior maxillary division of them. It is the remedy *par excellence* for neuralgias of the lower jaw, while there are many remedies just as certain and more effectual for general faceache.

Acute Nasal Catarrh.—For cold in the head, while in the acute congestive stage, I believe there is no better remedy. One good large dose, say 15 to 25 minims of the fluid extract, taken upon retiring at night, will effectually dispose of this troublesome and uncomfortable affection. One dose is usually sufficient, but should any supplementary treatment be required, a few insufflations of a four per cent. solution of hydrochlorate of cocaine will suffice.

The Urinary Tract.—I was led to use it in painful affections of the bladder and urethra by observing the case of an old man who had complete retention of urine from using this remedy in overdoses, on his own account. In relieving him with the catheter he was caused no inconvenience whatever by the presence of the instrument. Since then I have used it with the greatest success in dysuria from whatever cause. It diminishes the frequency of micturition, relieves or abolishes the pain, and reduces any inflammatory action that may be present. In simple irritability of the bladder in women, as a reflex of uterine or ovarian troubles, it is extremely serviceable in small doses, frequently repeated.

In gonorrhœa of the male I have found it an extremely valuable agent. Given in frequent doses, up to tolerance, care being taken not to affect the vision, it relieves this complaint in a most speedy manner. I find that a few days' use of gelsemium with an alkali, well diluted, together with the ordinary hygienic precautions, will suffice to so reduce the virulence of this disease that a few mild injections of a metallic nature usually suffice to promote a speedy and painless recovery.

In these few words I do not wish to pose in a scientific attitude, but simply to record some observations made in practice. A scientific therapeutist and physiological observer would no doubt be able to deduce the true inwardness of the action of the drug through the nervous system, and explain the phenomenon I once observed from a large dose of the remedy. Taken at bedtime, it cured the cold in the head, but produced complete paralysis of both thumbs, which was relieved by a couple of doses of brandy.

W. FRED. JACKSON, M.D.,
BROCKVILLE, ONTARIO, CANADA, October 20, 1888.

CASCARA SAGRADA IN RHEUMATISM.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—I notice in the columns of the October number of the THERAPEUTIC GAZETTE a statement that Mr. Jas. P. Martin, in the *Lancet*, suggests that cascara sagrada be combined with the salicylate of sodium in the treatment of rheumatism.

By referring to an article ("Cascara Sagrada in Rheumatism") published by me in the *New York Medical Journal* of June 9 last it will be found that I then suggested the combination in these words: "In one case in which neither it (cascara sagrada) nor the salicylate of sodium appeared to give much benefit, I combined the two with good effect."

I call the attention of your readers to this, not as wishing to claim any priority in suggesting the combination, but merely from a desire to endorse Mr. Martin's suggestion.

Since writing the article referred to I have continued the use of the cascara sagrada with the most gratifying results. Frequently I have combined it with the salicylate of sodium with the effect of getting a marked amelioration of the symptoms much quicker than I believe could have been done with the sodium alone. I prescribe it in the same doses (gr. xv of the sodium and ɱx of the cascara) suggested by Mr. Martin, but thus far never oftener than every four hours.

I prefer, however, giving the cascara alone, and believe that in the majority of cases nothing else will be required, unless it is a ferruginous or bitter tonic during convalescence.

The main objection to its use is its intensely disagreeable taste, which, however, can be partially overcome with proper flavoring.

H. T. GOODWIN,
Assist. Surgeon M.H.S.

CINCINNATI, OHIO, October 25, 1888.

Notes and Queries.

THE GERMAN TREATMENT OF OBESITY.

DR. I. BURNEY YEO, in the current number of the *Nineteenth Century*, discusses the Schweninger (Oertel) treatment of obesity, now popularized in Germany by a brochure which has gone through sixteen editions.

This system of treatment, which can hardly be said to be Schweninger's, being borrowed principally from Oertel, is directed mainly against the prevalent tendency (especially in Germany) to morbid obesity; in other words, to getting too fat. Dr. Yeo asks two practical questions,—1. Is there any harm in getting fat? 2. When may a man be said to be getting too fat? And in reply to the first question remarks, that a very fair share of health and activity is not inconsistent, in some constitutions, with a considerable amount of obesity. "As far as longevity is concerned, it may be some comfort to know that the tables of some of the American life insurance offices show that it is better to be much above the average weight than much below it; but it is better to be neither." He adds, however, that a great excess of weight due to an increased formation of fat is an abnormality closely bordering on disease. Such excess of adipose is, he says, almost always due to excess in eating, and fat persons who would get thinner should realize this fact. "A daily deposit of a quarter of an ounce of fat will, in ten years, increase the weight of the body by fifty-seven pounds." Excess of food includes excess of the albuminous group (which has been proved to be fat-forming as well as flesh-forming) as well as the carbohydrates (fatty, starchy, and saccharine foods). In the young and active, the food which they consume is appropriated in the building up of their tissues, and to the development of muscular and nervous energy; there is little or no excess or waste. When the age of growth has come to an end, but is succeeded by an active and vigorous life, food is needed to develop as much muscular and nervous energy as before, or more, but the food needed for growth is needed no longer. But when the period of growth and activity is succeeded by a life of inactivity or indolence or self-indulgence, then, if the same amount of food is taken as was consumed during the period of growth and vigorous exercise, there is a superfluity, which in some cases is deposited and accumulates in the organism in the form of an excessive amount of fat.

The consumption of alcohol favors polysarcia; so, also, does an indolent, inactive, luxurious life. Alcoholic stimulants restrain waste on well-known principles, and an indolent life promotes accumulation of force-making materials far in excess of expenditure.

Dr. Yeo considers the "Banting" system, and objects to it that it rests on an erroneous scientific foundation, which overlooks the fact that fat can be formed out of nitrogenous food, out of the lean of meat, for instance, as well as out of carbo-hydrates. "Not only does it often induce subjective feelings of discomfort and bodily feebleness, a great loathing of the constant and exclusively meat diet, as well as digestive disturbances, which necessitate its interruption, but it fails, in the more serious cases, to relieve the feebleness of the heart, the tendency to congestion of

the lungs, and even dropsy, which complicate the graver forms of excessive corpulency." Ebstein's "cure" allows all kinds of fatty food,—the fat of meat, butter, cream, fatty sauces, and soups,—but prohibits the carbo-hydrates, such as sugar, potatoes, and all forms of starchy food, and of bread permits, at most, three and a half ounces a day. All kinds of meat in small quantity, as well as asparagus, spinach, and cabbage, are permitted. Dr. Yeo remarks that the success which has attended the Ebstein method must be referred mainly to the abstinence from the carbo-hydrates which it enforces, but it is hardly sufficiently supporting, and fails to relieve the heart-disturbances which attend extensive obesity.

The Schweninger (or rather the Oertel) method not only provides for the removal of excess of fat, but it also prevents its re-accumulation, and at the same time restores tone to the organs of circulation, which so often, in cases of excessive obesity, is lost. Oertel's system agrees with those above given in reducing the carbo-hydrates in the diet of the obese. It allows more fat than the Banting formula, and nearly twice as much albuminous food as Ebstein's, less than half as much fat as the latter, and about twice as much carbo-hydrates. "This amount of fat and carbo-hydrates is admissible in those cases where active exercise can be and is taken, as muscular exertion is attended with a considerable destruction of fat, and the relative excess of albuminous food in this formula leads to the displacement of the fat accumulated in the substance of the muscles, and to a new formation of muscular tissue in its place. At the same time, this diet protects the nitrogenous tissue from waste, a condition of health which is lost sight of in Ebstein's method. Indeed, the central idea in this cure is to *strengthen the muscle of the heart*, and this is aimed at, not only by a carefully-considered dietary, but by the prescription of regular active bodily exercise and suitable gymnastics."

This method is somewhat modified in the management of those grave cases where the accumulation of fat about the heart has led to great embarrassment, or perhaps degeneration, of that organ, and to consequent visceral congestion, and even to dropsy. In such cases, the fat and carbo-hydrates of the food are still further reduced, and the amount of fluid consumed is severely restricted, and perspiration is promoted by vigorous bodily exercise, especially in climbing graduated ascents. The following, then, are the objects aimed at in this cure:

1. To improve the muscular tone of the heart.

2. To maintain the normal composition of the blood.

3. To regulate the quantity of fluid in the body.

4. To prevent the deposit of fat.

These objects are attained by the following means:

1. The muscle of the heart is strengthened by enforced exercise, such as *climbing heights*. This requires great care, and the exercises must be *graded*, the amount of work being increased as the patient can bear it.

2. To preserve the normal composition of the blood the food should be chiefly albuminous. It may consist of the lean of roast or boiled beef, veal, mutton, game, and eggs. Green vegetables (as cabbage or spinach) may be taken; fat and carbo-hydrates only in very limited quantities; from four to six ounces of bread per diem.

3. To regulate the quantity of fluid in the body the amount of fluid drunk daily must be limited. One cup (rather less than six ounces) of coffee, tea, or milk morning and evening, and about twelve ounces of wine, and from eight to sixteen ounces of water, shall comprise all the fluid consumed in twenty-four hours. Beer is entirely forbidden. The discharge of fluid from the body is promoted by active exercise, and occasionally by a course of baths, with packing.

4. To prevent the deposit of fat the principles of diet already set forth must be carried into practice as follows:

Morning.—One cup of tea or coffee, with a little milk, altogether about six ounces; bread about three ounces.

Noon.—Three to four ounces of soup, seven to eight ounces of roast or boiled beef, veal, game, salad, or a lighter vegetable, a little fish (cooked without fat) if desired, one ounce of bread or farinaceous pudding (never more than three ounces), three to six ounces of fruit, fresh preferred, for dessert. It is desirable at this meal to avoid taking fluids, but in hot weather, or in the absence of fruits, six to eight ounces of light wine may be taken.

Afternoon.—The same amount of coffee or tea as in the morning, with, at most, six ounces of water, an ounce of bread as an exceptional indulgence.

Evening.—One or two soft-boiled eggs, an ounce of bread, perhaps, a small slice of cheese. Salad and fruit, six to eight ounces of wine, with four to five ounces of water.

Such, briefly summarized, are the principles of this peculiarly German anti-fat regimen, for which, as Dr. Yeo rightly affirms, the credit almost entirely belongs to Professor Oertel, the main features of it having for years been set forth in his writings. These principles seem to commend themselves as sound, though their practical application will require continued modification to adapt them to the stage of the affection, to the constitution and habits of the patient.—*Boston Medical and Surgical Journal*, September 20, 1888.

THE ELECTRICAL TREATMENT OF UTERINE FIBROIDS.

During the last few months the method of treatment of uterine fibroids suggested by Dr. Apostoli has excited a great deal of attention, and has come very largely into use. In the societies several very animated, not to say acrimonious, debates have taken place, and the advocates of this particular procedure have had to withstand attacks of the most violent description at the hands of those who disbelieve in it. Virtually two camps have been formed, and the struggle has been constant and severe.

One reason why Apostoli's plan has met with such stout opposition is probably that its advocates have, in many instances, allowed their zeal to outrun their discretion in advancing its claims. Long before many of them had thoroughly mastered the technics of the force which they employed, the most extravagant forecasts were made as to the benefits to be anticipated from its employment. With a remarkably scanty array of facts in support of their pretensions, they boldly ventured to beard the lion in his den, and brought before their compeers a number of cases which were necessarily inconclusive and often positively unsatisfactory.

Let us now examine for ourselves the nature of this treatment, which has set gynæcologists by the ears and given rise to heated arguments and bitter repartee. The idea of utilizing the effect of electricity in stimulating muscular fibre to contraction, for the purpose of checking uterine hemorrhage, and incidentally for aiding the spontaneous enucleation of interstitial fibroids, is by no means new. In one form or another, and for this or that purpose, it has been extensively resorted to, as any authority will tell us. In suitable cases this treatment was often productive of good, and, in any event, did not expose the patient to any great risks. Not very long after M. Apostoli had revealed his method to an astonished and admiring world, the *modus operandi* was suddenly *soi-disant* improved upon, and instead of merely passing the current through the uterus and its tumors by means of one electrode in the vagina or uterus, and the other applied to the abdominal walls, arrangements were made for plunging insulated needles into the substance of the tumors. This departure evidently exposed patients to risks from which the other was free; though, on the other hand, it caused a lessening of the bulk, and even the complete disappearance, of tumors which had resisted the mere anodyne treatment. The action set up in this way was ascribed—erroneously enough, in all probability—to electrolysis,—that is, electrical decomposition of the tissues into their component parts. So far no trustworthy evidence has been adduced of the existence of any such action, and it is more than probable that the success of the treatment is due to the purely caustic action of the current. It is a well-recognized fact in connection with these fibroid tumors that if the degenerative process be once started it is very apt to go on until the tumor is destroyed. In other words, there is every chance of the fibroid being made to slough. Now, every student of gynæcology must be cognizant of the grave danger to the patient of such a process, and the records of Apostoli's disciples afford ample proof thereof, were any such needed.

The arguments against this method of treatment may be summarized as follows: That, except under very favorable circumstances, no effect of a permanent nature is produced, and that in those cases in which a good result has followed, the same might have been attained by simpler, less expensive, and less hazardous means. Secondly, that, in graver cases, the risk of inducing sloughing of the fibroid more than compensates for any advantages which the method may be claimed to possess over removal of the tumor through an abdominal incision or *per vaginam*. These arguments the electro-gynæcologists will find it difficult to refute, for there is no lack of cases bearing them out. Mere mortality returns, of course,

prove nothing, because no similarity between the units of comparison can be guaranteed. The recorded successes are by no means striking, either in kind or number, while the risks of the treatment are obvious. Even in the most satisfactory cases time alone will show to what extent the relief obtained is of a permanent character.

The discussion at the Glasgow meeting of the British Medical Association did not throw much additional light upon the subject, while Sir Spencer Wells, Drs. Aveling, Thompson, and others testified to sundry good results. Mrs. Garrett Anderson, Dr. Edis, and others gave evidence to the contrary. The only salient feature of the discussion was the emphatic declaration of Dr. Apostoli that his method "was in no sense a radical cure for uterine fibromata, but that it would, under favorable circumstances, lead to an amelioration of the most distressing symptoms." This remarkable assertion is somewhat in contradiction with the classical maxim *sublatâ causâ, tollitur effectus*. If his treatment avowedly leaves the cause untouched, it is evident that no permanent improvement can be hoped for. As it is, the treatment is extremely tedious, protracted, and therefore costly; uncertain, and therefore discouraging. If the amelioration so dearly purchased be only a temporary respite, neither doctor nor patient will be willing to incur the sacrifice of time, money, and patience which it occasions.—*London Medical Recorder*, August 20, 1888.

THE INFLUENCE OF THE USE OF THE TELEPHONE UPON THE HEARING POWER.

A paper on this subject by Dr. Clarence J. Blake, of Boston, was read by Dr. John Green, of St. Louis, at the recent meeting of the American Ophthalmological Society at Washington (*New York Medical Journal*, October 6, 1888). The author said that the assertion made by him several years since, that the habitual use of the telephone would be prejudicial to the hearing in many cases where the hearing was already impaired, was based upon the well-known facts of the process of accommodation in the middle ear for the transmission of tones of low intensity, of the susceptibility of the percipient apparatus to shock from sharp sounds of high intensity under the conditions of that process, and upon the results of measurements of the vibrations of telephone disks made for the purpose of determining approximately the loss of power between the transmitting and receiving telephones. These experiments, the results of which had been embodied in a paper read before the British Society of Telegraph Engineers in London in 1878, consisted in connecting two hand telephones, similar to those at present in general use, by means of flexible wires, and recording the excursions of the disks of both the transmitting and receiving telephones by means of fine platinum wires tracing upon smoked glass. The excursion of the transmitting telephone disk without the magnet was first recorded, and the average for all the readings for a constant tone of 448 v. s., measured under the microscope with micrometer eye-piece, was .2625 millimetre. The deflection of the centre of the disk under magnetic attraction was .061 millimetre, the result of this being a decrease of the excursion in response to the same tone to .180 millimetre, a difference in the length of the excursion of .0725 millimetre, or about 27.65 per cent.

Under the condition of fatigue, of relaxation, the ear became peculiarly susceptible to the shock imparted by such sharp metallic sounds as were constantly apt to occur in the practical use of the telephone from sudden variation in current and the breaking of connections, the danger to the ear, already impaired in its accommodative power by a middle-ear disease, being both from the tax upon its enfeebled accommodation and from the sudden shock of sounds to the ear, for protection from which there could be no voluntary preparation, the danger to the ear being always greater from such forms of receiving telephones as were attached to the head, and a proper precaution being that the telephone should be held at a short distance from the ear or at an angle of about forty-five degrees in front of it.

Later experiments had been made by Professor W. W. Jaques, who had arrived at very similar results. The author concluded by saying that these facts so amply confirmed the previous statements that they should be well borne in mind, especially since the telephone was an instrument the use of which would in the future increase rather than diminish, and since it was, moreover, not likely with our present knowledge to be essentially improved, the principal gains in clearness and distinctness of sound transmitted having to come from improvements in the means of communication rather than from changes made in the receiving instrument itself, all

attempts at dampening the high metallic over-tones and improving the qualitative distinction between the consonant sounds by changing the structure of the receiving telephone having resulted in a corresponding loss of that intensity of which, as had been shown, there was so little to spare.

RHINANTHIN.

A glucosidal substance, "similar to digitalin," obtained by DR. PHIPSON from the common snapdragon (*Antirrhinum majus*), has been identified by him with rhinanthin, a glucoside extracted twenty years ago by Ludwig from the seeds of *Rhinanthus hirsutus* and *R. Crista-Galli* (*Chem. News*, August 31, p. 99). Dr. Phipson describes rhinanthin as occurring rather plentifully in the leaves and stalks of the snapdragon, from which it can be separated by macerating the plant in cold water for a few days, filtering, and treating the filtrate with a small quantity of lead subacetate, again filtering and removing any excess of lead, and evaporating the liquid to a syrup. After a few days rhinanthin separates in brilliant transparent, colorless rhombic crystals, having a peculiar sweetish acrid taste and very soluble in water and in alcohol. A clear, colorless aqueous solution of rhinanthin heated in a test-tube with a few drops of hydrochloric acid turns gradually brown, and just after boiling becomes dark and opaque, through the breaking up of the glucoside; a copious reddish-brown precipitate of rhinanthogen is formed and glucose can be detected in the liquor. This reaction is said to be a very delicate test for the presence of rhinanthin.—*Pharmaceutical Journal and Transactions*, September 29, 1888.

PARA- AND META-PHENYLENEDIAMINE.

In a note on the physiological action of para- and meta-phenylenediamine, by MESSRS. DUBOIS and VIGNON (*Compt.-Rend.*, cvii. p. 533), some very interesting and important facts are brought forward. These bodies have a remarkable similarity in their physiological action to leucomaïnes and ptomaïnes. In the dose of .01 gramme ($\frac{1.5}{100}$ gr.) per kilogramme of the animal both these bodies cause in the dog salivation, vomiting, diarrhœa, abundant excretion of urine at intervals, and death by coma, occurring in two or three hours when para-phenylenediamine is given, and in twelve or fifteen hours when meta-phenylenediamine is administered. Besides this general effect, however, each of these bases present special peculiarities. Meta-phenylenediamine causes in the dog all the symptoms of intense influenza. The animal appears to be seized with acute coryza and sneezes constantly; then follows a characteristic hoarse cough; finally, the ears and nose become hot and inflamed. The animal then becomes extremely depressed and indifferent to its surroundings, and ultimately dies in a comatose state. Para-phenylenediamine exerts a special action on the eye; it causes, soon after a subcutaneous injection of it in any part of the body, an extraordinary exophthalmia. The eye by degrees comes out of its orbit, the conjuctiva becoming pale and œdematous, and forming an enormous swelling, which almost hides the cornea. All the intraorbital cellular tissue becomes infiltrated and the lachrymal glands are blackened by a deposit of pigment. The meta-phenylenediamine was obtained by means of the action of tin and hydrochloric acid on pure meta-dinitrobenzene, the tin being subsequently removed by hydrogen sulphide and the base taken up by ether, which on evaporation left the crude base; this was purified by distillation in a current of hydrogen and crystallization from benzene. The para-phenylenediamine was obtained in the same way from pure orthonitraniline.—*Pharmaceutical Journal and Transactions*, September 29, 1888.

CONDURANGO IN THE TREATMENT OF CARCINOMA OF THE STOMACH.

The treatment of cancer by condurango (the bark of *Gonolobus condurango*, Richard, or *Marsdenia condurango*, Brown, an Asclepiadacea indigenous in Ecuador and Peru, especially in the Peruvian province of Loja), which at its first introduction by Friedreich in 1874 had been hailed with so much expectation, soon fell into oblivion. Lately, however, it was submitted to a methodical investigation, first by Immermann in a limited number of cases, and by Riess in a larger number of specific character, which have recently been published. Riess wishes to limit the use of this remedy entirely to the treatment of carcinoma of the stomach, and from his experiences in eighty cases treated with, and in one hundred and sixteen cases treated without, condurango, pronounces for its specific action. "The observation," he maintains, "of a greater series of cases produced the convic-

tion that the lives of many patients had been considerably prolonged by the condurango treatment. Orszewcky and Erichsen state that the use of condurango bark stimulates the development of connective tissue, and at the same time the disintegration of the cellular elements of the cancer." PROFESSOR EWALD (*London Medical Recorder*, August 20, 1888) does not deny the favorable effect of condurango on the general condition of patients suffering from carcinoma of the stomach. "With good reason," he says, "and in consequence of the important observation of Riess, the condurango is at present extensively employed. It improves the concomitant gastric catarrh, and, having the same favorable effect in general muco-catarrhal diseases of the mucous membrane of the stomach, the condurango proves an excellent stomachic in all the cases in which there is a genuine catarrh of the mucous membrane,—*i.e.*, the secretion of a muco-serous, more or less purulent, fluid."

PICROADONIDIN, THE ACTIVE PRINCIPLE OF ADONIS VERNALIS.

PROFESSOR PODVYSOTSKI, of Kazan, publishes in the *Meditsinskoe Obozrênie* some researches he has been making upon the active principle existing in *Adonis vernalis*. He finds by chemical analysis of the entire plant there is an amorphous substance of the nature of a glucoside (picroadonidin) which is the active principle, but that together with this there are present an orange-yellow substance (adonido-quercitin), a sugar (adonido-dulcitum), which crystallizes in beautiful prisms, a physiologically inactive glucoside, and an acid already pretty well known, and existing in *Aconitum Napellus* and some species of *Equisetum*, and therefore called aconitic or equisetic acid, $C_6H_6O_6$. Hitherto, according to Professor Podvysotski, all attempts to isolate the active principle of *Adonis vernalis* have resulted in mixtures of the several substances named in various preparations, so it is not surprising that the so-called adonidins of different observers presented very dissimilar properties. Picroadonidin has an extremely bitter taste. It is easily soluble in water and alcohol, and slightly so in chloroform. It possesses all the physiological properties of the plant itself in a very high degree. The author proposes to publish further researches on the chemical properties of this substance in the course of the next two or three months. —*Lancet*, October 13, 1888.

PHYSIOLOGICAL ACTION OF IRON.

In a preliminary note in the *Vratch*, No. 29, 1888, p. 561, DR. SKVORTZOFF publishes the results of experiments on dogs, carried out by him in Professor L. J. Tümas's pharmacological laboratory, in Warsaw, with the view of determining the action of iron on nitrogenous metabolism in a healthy organism. The following are his conclusions: 1. Iron has no marked influence on the nitrogenous metamorphosis in a healthy system. 2. On the internal administration of iron in daily doses over .02 or .03 gramme, the assimilation of the nitrogenous ingredients of food decreases, though but slightly (from 98.4 per cent. before the experiment to ninety-seven per cent. during it). 3. After venesection the assimilation somewhat increases, both on the administration of iron and without it. 4. On the administration of iron with food after venesection, the restoration of hæmoglobin proceeds more rapidly than without iron. 5. The same holds true in regard to the body's weight.—*British Medical Journal*, September 29, 1888.

BARON FERDINAND VON MUELLER, for many years Government Botanist at Melbourne, has been elected President of the Australian Association for the Advancement of Science for the year 1888. The list of titles, fellowships, and memberships of this distinguished writer and author on botanical subjects is a very long one, as is that of the titles of his works. Perhaps the most important of the latter is the "Flora Australiensis" written conjointly with Mr. George Bentham, and published in seven volumes from 1863 to 1868. Among Mr. Mueller's titles is that of M.D., and the relations of botany to medicine have always claimed much of his attention. His elaboration of the vast genus Eucalyptus is one of his most critical works. Although thoroughly scientific, Dr. Mueller's observations have always been characterized by a rare degree of practical application. One of his more recent works, published in English by George S. Davis, of Detroit, "Select Plants Suitable for Culture in Extratropical Countries," is an exhaustive epitome of its subject, and may claim the closest attention of those interested in extending the cultivation of the valuable members of the vegetable kingdom, as well as of those interested in the origin of our economic plants.